# RAILWAY MECHANICAL ENGINEER

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# Coordinated Mechanical Meetings

**Programs of five associations—Sessions at the Hotel Sherman on September 20 to 22 inclusive**

THE annual meetings of five Coordinated Mechanical Associations will be held at the Hotel Sherman, Chicago, on September 20 to 22, inclusive. There will be no exhibit by the Allied Railway Supply Association, Inc., this year. The meetings of the Electrical Sections of the Mechanical and Engineering Divisions, respectively, of the Association of American Railroads, which were held at the Hotel Sherman on September 8, 9, and 10, were accompanied by an exhibit this year. Exhibits of these two groups will probably continue on alternate years.

New officers elected in 1947 by the coordinating committee of the Coordinated Machanical Associations, which is made up of the presidents and secretaries of the five railway associations and the exhibiting organization, are: Chairman, J. E. Goodwin, vice-president and executive assistant to the president, Chicago & North Western; vce-chairman, J. M. Nicholson, assistant to vice-president, Atchison, Topeka & Santa Fe, and, secretary, C. F. Weil, secretary-treasurer of the Allied Railway Supply Association.

One of the first tangible moves toward the coordination of the meetings and exhibits of the numerous mechanical department associations was the organization on May 4, 1931, of the Allied Railway Supply Association, Inc. This combined the supply groups formerly affiliated with the Traveling Engineers' Association, the Air Brake Association, the International Railway General Foremen's Association, the Master Boiler Makers' Association, the Internatioial Railway Fuel Association, the Railroad Master Blacksmiths' Association, and the Car Department Officers' Association. This gave direction to eliminating over-lapping exhibits and toward holding several annual meetings simultaneously. Coordinating the work of the various railroad associations was under study by a committee of the Mechanical Division, A.A.R., then and during subsequent years. Much of the detail work in connection with these coordinated studies, especially the arrangement of the early joint meetings, was done by Grank P. Roesch, vice-president of the Standard Stoker Company, and T. Duff Smith, secretary of the present Railway Fuel and Traveling Engineers' Association. In the fall of 1937 the present committee of the Coordinated Mechanical Associations was organized. Mr. Roesch served as chairman, and T. Duff Smth as secretary until after the 1947 conventions.

W. E. Vergan, President, Air Brake Assn. →

C. D. Allen, President, L.M.O.A.

S. A. Dickson, President, R.F. & T.E.A.

← I. M. Peters, President, C.D.O.A.

S. E. Christopherson, President, M.B.M.A.

## Joint Session

MONDAY, SEPTEMBER 20
11 a.m.

This session, at which J. E. Goodwin will preside, will be addressed by J. H. Aydelott, vice-president, Operations and Maintenance Department, Association of American Railroads. The programs of the individual associations appear on the following page.

## Railway Fuel and Traveling Engineers' Association

MONDAY, SEPTEMBER 20

*2 p.m.*—Address by President S. A. Dickson, terminal trainmaster, G. M. & O.
Address by J. J. Brinkworth, vice-president, New York Central System.
Passenger-Train Handling with Pneumatic Brake Equipment, H. J. Tramblie (chairman), air-brake engineer, C. B. & Q.
Freight-Train Handling, F. T. McClure (chairman), supervisor air brakes, A. T. & S. F.
Fuel Statistics.

TUESDAY, SEPTEMBER 21

*9 a.m.*—Front Ends, Grates, Ashpans and Arches, S. R. Tilbury (chairman), fuel supervisor, A.T. & S.F.
Operation of Steam Generator on Diesel Locomotives, R. D. Nicholson (chairman), road foreman of engines, N.Y.N.H. & H.
Diesel Locomotive Operation, H. N. Ricks (chairman), fuel supervisor, T. & P.
Report of Secretary-Treasurer.
Training of Locomotive Firemen (Coal), W. E. Sample (chairman), superintendent fuel conservation, B. & O.
Training of Locomotive Firemen (Oil), R. H. Francis (chairman), general road foreman of equipment, St.L.S.F.
Smoke Abatement in Building Fires and Control of Smoke on the Road, G. B. Curtis (chairman), road foreman of engines, R.F. & P.

WEDNESDAY, SEPTEMBER 22

*9 a.m.*—Fuel Economy in Stationary and Direct Steaming Plants, B. E. Clark (chairman), electrical supervisor, A.T. & S.F.
Water Treatment for Steam Locomotives, T. A. Tennyson (chairman), chief chemist, St.L.S.W.
Water Treatment for Diesel Locomotives, M. A. Hanson (chairman), G.M. & O.
Storage Coal Handling, Glen Warner (chairman), fuel supervisor, Pere Marquette District, C. & O.
The Unit Cost of Coal on Locomotives, A. A. Raymond (chairman), superintendent fuel and locomotive performance, New York Central System.
Election of officers.

*2 p.m.*—Regional Locomotive Fuel (Coal) Standards, Earl C. Payne (chairman), consulting engineer, Pittsburgh Consolidation Coal Co.:
a—Analyzing troubles causing loss of steam locomotive availability, by R. A. Rayer, research assistant, I.C.
b—Obtaining satisfactory coal for steam locomotives, by W. L. Lloyd, assistant engineer, Penn.
c—Research for the improvement of steam motive power, by R. A. Sherman, assistant director, Battelle Memorial Institute
d—Production and preparation of coal for locomotive fuel, by Earl C. Payne.

## Master Boiler Makers' Association

MONDAY, SEPTEMBER 20

*10 a.m.*—Address by President S. E. Christopherson, supervisor of boiler inspection and maintenance, N.Y.N.H. & H.
Address by C. B. Peck, editor, *Railway Mechanical Engineer*.
Report of the Executive Board.
Message by Secretary-Treasurer.

*2 p.m.*—Topic No. 6. Benefits to be derived from properly cooling down and firing up locomotive boilers, Carl A. Harper (chairman), general boiler inspector, C.C.C. & St.L.
Topic No. 4. What improvements can be made in the maintenance and inspection of steam locomotives to increase their availability? R. W. Barrett (chairman), chief boiler inspector, C.N.

TUESDAY, SEPTEMBER 21

*9 a.m.*—Address by O. E. Barefoot, superintendent of motive power and car departments, Can. Pac.
Topic No. 1. Fusion welding and cutting of alloy steel as used in modern steam locomotive boilers, Edward H. Heidel (chairman), general boiler foreman, C.M.St.P. & P.
Report of Secretary-Treasurer.

*1:15 p.m.*—Address by E. C. Payne, consulting engineer, Consolidation Coal Company.
Topic No. 2. Recommended practices for staybolt application and maintenance, Dr. G. R. Greenslade (chairman), director of research, Flannery Bolt Co.
a—Tolerances used with taps and staybolts.
b—Tools used with threading gauges, etc.
c—Seal welding of staybolts.
Topic No. 3. What improvements can be made in water circulation, ash pans, front ends and brick arches to increase the steaming qualities of steam locomotive boilers, Arthur Williams (chairman), vice-president, Superheater Co.

WEDNESDAY, SEPTEMBER 22

*9 a.m.*—Topic No. 5. Study of the causes for and corrective measures necessary to prevent cracking of boiler shell plates made of various steels. Ray McBrian (chairman), engineer of standards and research, D. & R.G.W.
Election of Officers.

*1:30 p.m.*—Report of the Committee on Law.
Report of the Committee on Memorials.
Report of the Committee on Resolutions.

## Locomotive Maintenance Officers' Association

MONDAY, SEPTEMBER 20

*11 a.m.*—Address by J. D. Loftis, chief of motive power and equipment, A.C.L.

*3 p.m.*—Training of Mechanical Personnel with Diesel Specialization, E. P. Gangewere (chairman), superintendent motive power and rolling stock, Reading.

TUESDAY, SEPTEMBER 21

*9 a.m.*—Maintenance of Diesel Engines, Auxiliaries and Connectors and Steam Generators, H. F. Mackey (chairman), supervisor Diesel engines, A.T. & S.F.

*2 p.m.*—Maintenance of Electrical Equipment on Diesel-Electric Locomotives—Traction Motors and Generators, Control Equipment, Storage Batteries and Auxiliaries, R. I. Fort (chairman), assistant research engineer, I.C.

WEDNESDAY, SEPTEMBER 22

*9 a.m.*—Shop Re-Tooling for Maintenance on Diesel-Electric Locomotives, H. H. Magill (chairman), superintendent of locomotive and car shops, C. & N.W.
Locomotive Terminal Facilities—Modern Diesel Locomotive Servicing Facilities, H. E. Niksch (chairman), master mechanic, E.J. & E.
Address by C. B. Hitch, chief mechanical officer, C. & O.

*2 p.m.*—Installation of Modern Steam Locomotive Servicing Facilities, C. E. Pond (chairman), assistant to superintendent motive power, N. & W.
Enginehouse Inspection and Maintenance of Roller Bearings, John Whalen (chairman), shop superintendent, M.P.

## Air Brake Association

MONDAY, SEPTEMBER 29

*2:30 p.m.*—Paper on Maintenance of AB Brakes.

TUESDAY, SEPTEMBER 21

*9 a.m.*—Fundamentals of Braking.
Load Compensating Brake.

*3 p.m.*—Decelostat and Decelostat Sanding.

WEDNESDAY, SEPTEMBER 22

*9 a.m.*—Mechanically Driven Air Compressors for Diesel Locomotives—Maintenance and Testing.
Maintenance and Testing HSC brake equipment.

*3 p.m.*—Approved Maintenance Practice.

## Car Department Officers' Association

MONDAY, SEPTEMBER 20

*2:30 p.m.*—Address by President I. M. Peters, secretary and superintendent, Crystal Car Lines, Chicago.
Preparation of Freight Cars to Meet Present-Day Operation, by A. H. Keys, superintendent of car department, B. & O.

TUESDAY, SEPTEMBER 21

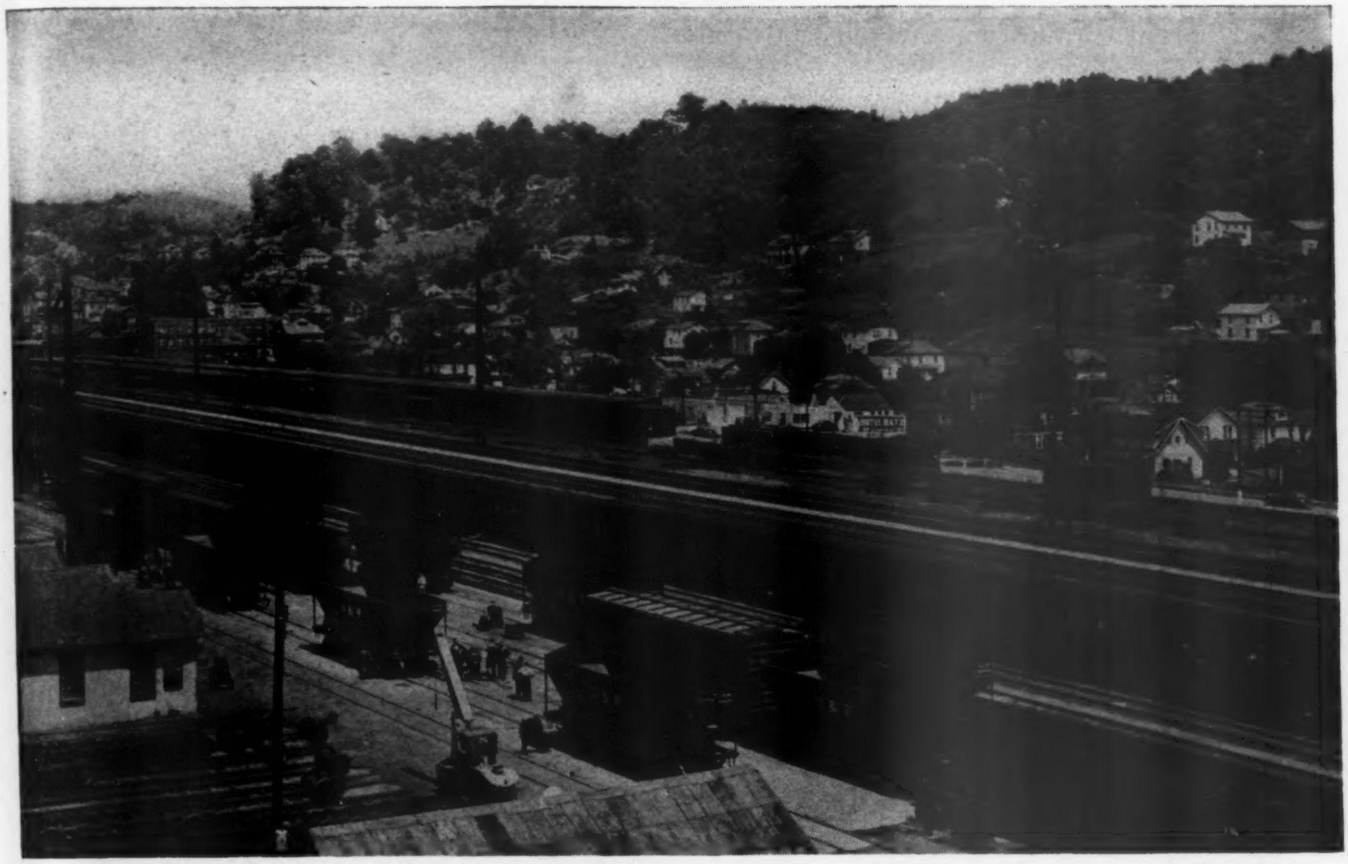
*9 a.m.*—Address by W. L. Ennis, assistant to vice-president, C.M.St.P. & P.
Interchange and Billing for Car Repairs, by R. W. Hollon, mechanical inspector, C.B. & Q.
A.A.R. Loading Rules, by H. L. Hewing, district general car foreman, C.M.St.P. & P.

*2 p.m.*—Passenger-Car Heating—Operation and Maintenance, by J. R. Standley, inspector, Pullman Co.
Air-Conditioning Equipment—Operation and Maintenance, by G. A. Shaffner, general supervisor, C. & N.W.

WEDNESDAY, SEPTEMBER 22

*9 a.m.*—Address by A. H. Gass, chairman, Car Service Division, A.A.R.
Committee on Painting, by H. E. Kneedler, painter foreman, C. & E.I.

*2 p.m.*—Wheel Shop Practices, by R. L. Frame, foreman, N.Y.C.
Car Lubrication Practices, by F. H. Campbell, general inspector, C.M.St.P. & P.
Election of officers.

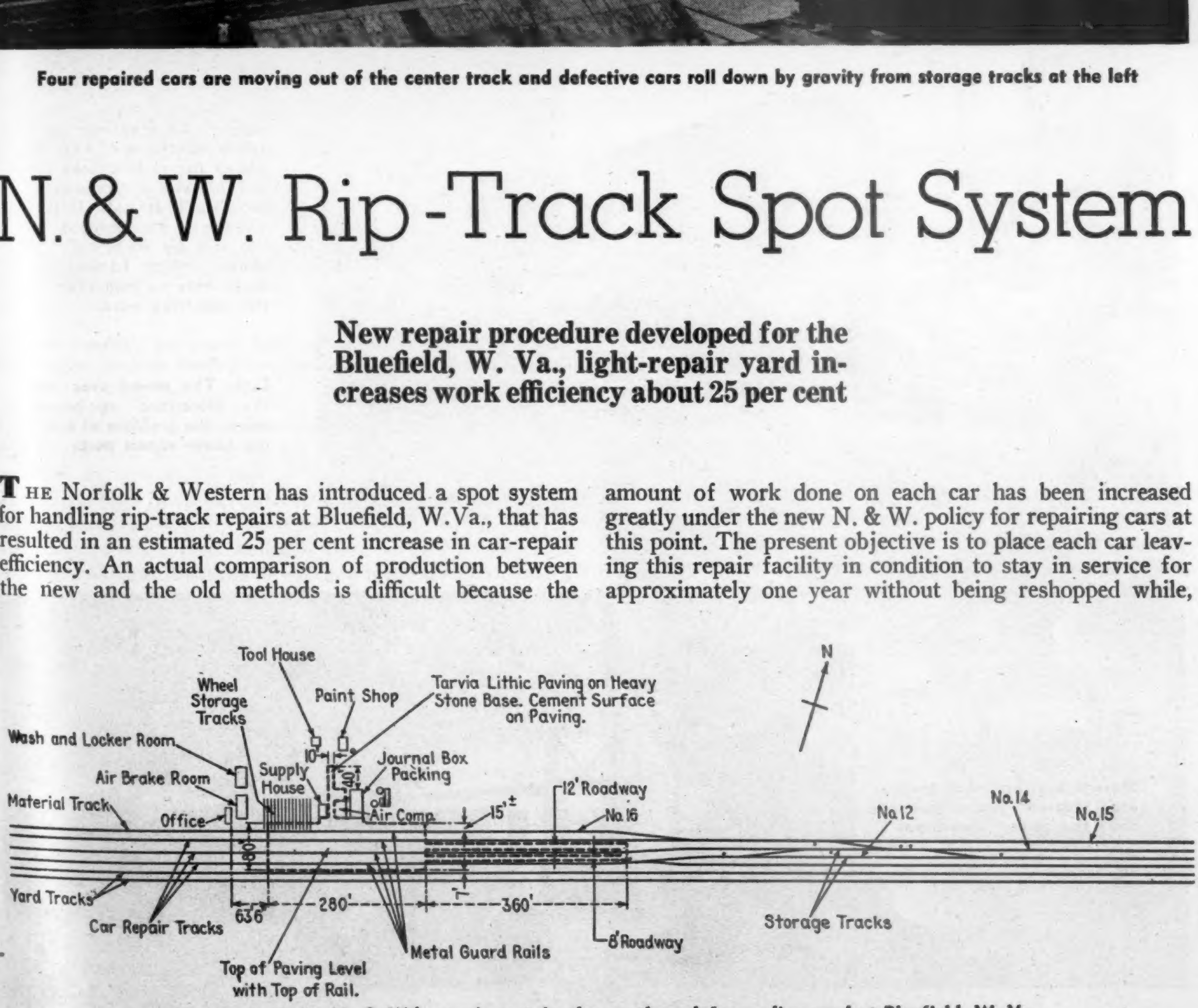


Four repaired cars are moving out of the center track and defective cars roll down by gravity from storage tracks at the left

# N. & W. Rip-Track Spot System

**New repair procedure developed for the Bluefield, W. Va., light-repair yard increases work efficiency about 25 per cent**

THE Norfolk & Western has introduced a spot system for handling rip-track repairs at Bluefield, W.Va., that has resulted in an estimated 25 per cent increase in car-repair efficiency. An actual comparison of production between the new and the old methods is difficult because the amount of work done on each car has been increased greatly under the new N. & W. policy for repairing cars at this point. The present objective is to place each car leaving this repair facility in condition to stay in service for approximately one year without being reshopped while,




The layout of the N. & W.'s repair spot in the westbound forwarding yard at Bluefield, W. Va.

formerly, cars were repaired in general only for the defect for which they were taken out of service.

The new repair set-up at Bluefield involves moving the cars and the necessary materials to the men and their tools located in a small working area. In a sense, the new procedure approaches the assemblly-line system used successfully to increase the production in most industrial and many railroad shops. This concentration of repair operations at one spot eliminates a large proportion of the non-productive time and the tiring manual effort required to transport heavy tools and materials over relatively long distances, the working arrangement in the usual light-repair yard where the bad-order cars are scattered over several thousand feet of trackage.

Westbound freight trains moving into Bluefield consist mainly of empty coal cars that have been unloaded at the eastern seaboard and are on their way back for loading at the bituminous mines that lie in the region just west of that point. The Bluefield passenger station is at the apex of an ascending grade from the east and a descending grade toward the west. The westbound receiving and forwarding yards are located west of the station on the descending grade.

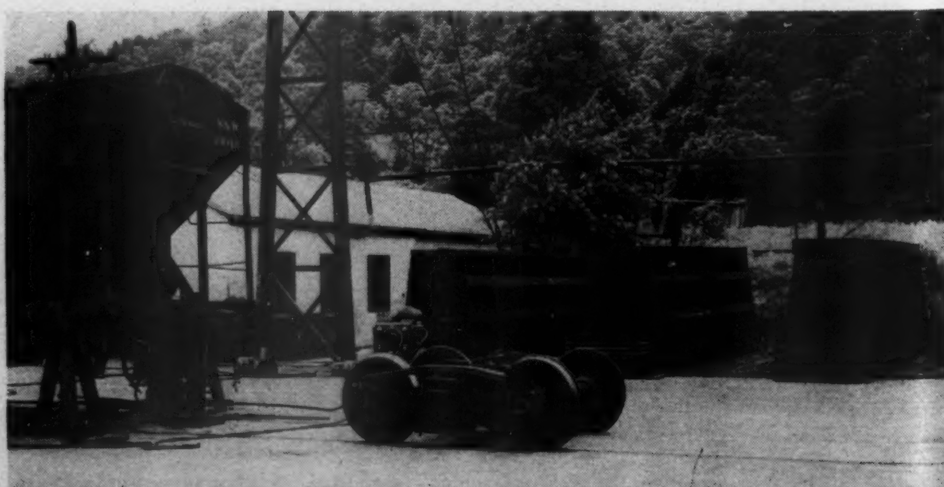
## Interior Inspection of Moving Trains

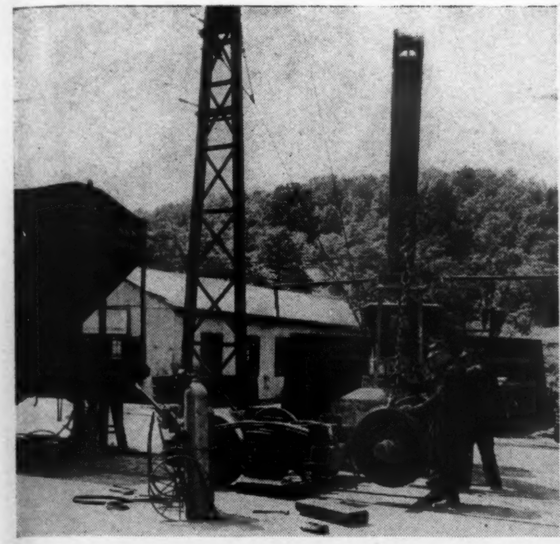
A visual inspection of open-top car interiors and the tops of box cars is made as the freight trains approach the westbound receiving yard. This first operation in the car repair procedure is performed by a car man standing

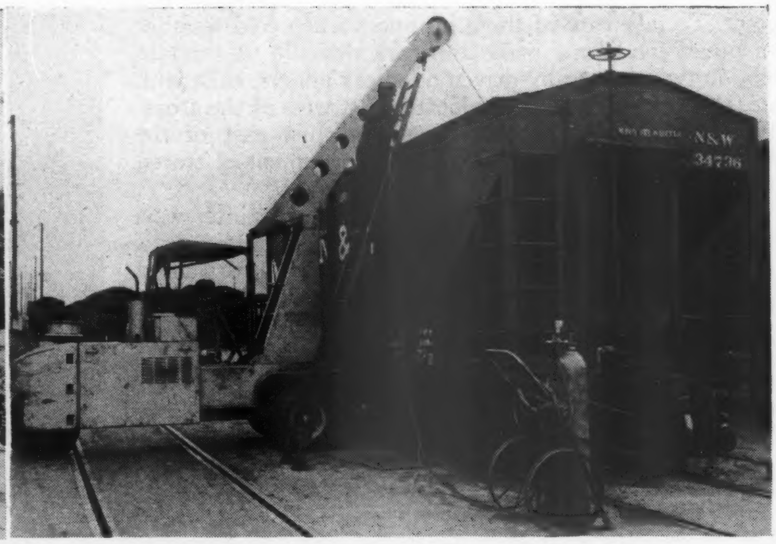
Above: An inspector on a tower platform 22½ ft. above the rails checks the car interiors of trains moving into Bluefield. Defective cars are marked on the side by whitewash, as shown, which identifies these cars to inspectors in the receiving yard

Left: The paved area and the motorized equipment solves the problem of moving heavy repair parts

Storage bins for small parts are located conveniently near the repair operations







**Left: A mobile crane assists in wheel-changing operations on any spot of the rip track—Right: Straightening car sides is one of the many jobs performed by the mobile motorized equipment**

**Material-handling equipment helps to speed up repairs by lifting heavy parts, such as draft gears, into position**

on the platform of an inspection tower located approximately one-half mile east of the Bluefield station. Standing 22½ ft. above the top of the rail the inspector can see easily any obvious defects such as broken braces, holes in slope sheets, broken running boards and defective roofs as the cars pass beneath him. When a defect is spotted the inspector pulls down on a lever which operates a mechanism that squirts a whitewash solution on the side of the defective car. This inspection method eliminates the time and energy required of the inspection force in the receiving yard to climb every car to check the condition of the interiors. It is only necessary to climb those cars marked with whitewash in order to verify and list the defects discovered by the inspector in the tower. About two or three per cent of the cars arriving at Bluefield have interior defects.

After the train is yarded, it is inspected and the cars found defective are carded and switched out to one of two tracks (Nos. 12 and 14) in the westbound forwarding yard. The cars are stored on these two tracks east of cross-overs that permit them to be switched to any one of the four tracks at the repair spot as indicated by the drawing showing the lay-out of the tracks and the facilities at this point.

A further inspection of the cars is made at the storage tracks with the inspectors keeping in mind that the objective is to recondition each car for approximately a year of service without re-shopping. The inspectors at the storage tracks also determine the extent of the repairs required and the approximate time needed to repair each car. The track at the repair spot to which a car is switched depends upon the time involved because cars requiring approximately the same length of time for repairs are kept together on the same track or tracks at the spot. After this inspection is completed, the cars are moved to a point just east of the repair spot on tracks 12, 14 and 15 from where they are moved to the spot as required. Track 16 is used normally as a material delivery track and, therefore, it is not used as a repair track unless the space is urgently needed for that purpose.

### Cars Moved by Gravity

The forwarding yard is on a grade of slightly over one per cent descending in a westerly direction. This gradient permits the movement of all cars by gravity at the repair


**Stenciling is the final operation performed on repainted cars**

point. To take care of those instances when cold weather or other conditions make the cars difficult to start in motion two electrically-driven fixed car pullers, each with a 5,000-lb. starting pull, are located just west of the cross-over switches. Derailers are installed just east of the repair spot to prevent the accidental movement of stored cars into the repair spot.

As shown by the drawing, the entire repair spot is paved and an extension of the paving has been laid for a distance of 360 ft. to the east between tracks Nos. 12 and 14, and 14 and 16. In the area served by the paved extension, the cars awaiting movement to the repair spot receive preliminary attention. When a car requires periodical work, such as re-packing journal boxes and cleaning air brakes, this work, with the exception of adding waste to the journal boxes, is performed here.

The cars are dropped down to the repair spot in groups of four on each of the three repair tracks and are uncoupled and spaced to give working room between them. The movements of incoming defective cars and outgoing repaired cars are made simultaneously as shown in one of the photographs. Movements are made when repairs to all four cars on any one track are completed. A warning to workmen of the change is given by one of three air-operated whistles, each with a different tone, to signal a car move on one particular track. A man rides each cut of cars and controls them with a hand brake. When the incoming cars reach the spot they are uncoupled one by one and blocked in position.

## Material-Handling Methods

Materials for the repair work are brought to the repair point by cars, moved in on track No. 16, unloaded and stored in the permanent structures conveniently located adjacent to the working area. Heavy materials are handled to the storage facilities and from them to the point of use by motorized material-handling equipment. The yard is equipped with a mobile truck-crane of five-tons capacity, a fork truck with a two-ton lift and a truck tractor for hauling trailer loads. In addition to the movement of heavy materials the motorized equipment is also used in the actual repair work such as lifting draft gears into place, straightening car sides and ends, and lifting wheel pairs. The flexibility of the mobile cranes and trucks is demonstrated by the fact that wheel changes at Bluefield were formerly made only on one track at one position having fixed hoists while now they can be made on any track at any location within the limits of the paved area.

Other portable equipment used in making repairs include two electric welding machines, oxyacetylene outfits and power jacks. Compressed air is furnished through pipe lines laid under the paving with underground outlets spaced conveniently along the tracks. Because of the possibility of leaks developing, the oxygen and acetylene were not piped throughout the area.

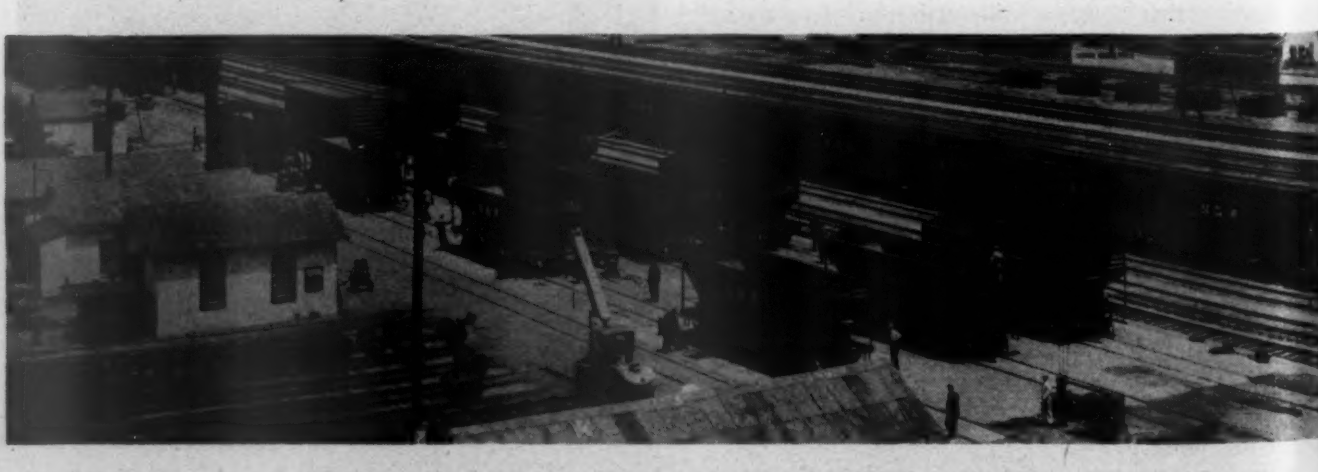
Journal boxes are repacked and cars are spray painted at this position west of the repair point

After the repairs are completed on any one track the cars are dropped down to a position approximately 100 yards west of the repair spot where those cars needing a coat of paint are spray painted immediately and the journal boxes are either repacked or checked. Cars receiving paint are re-stenciled the next day at another location just west of the paint and journal-box position. After this work is completed the cars are ready for service.

The Bluefield rip track operates with one working shift composed of 17 mechanics, 2 air brake repairers, 2 painters, 10 helpers, 3 oilers and packers, 3 truck operators and 14 laborers, a total of 51 men.

## Production Record

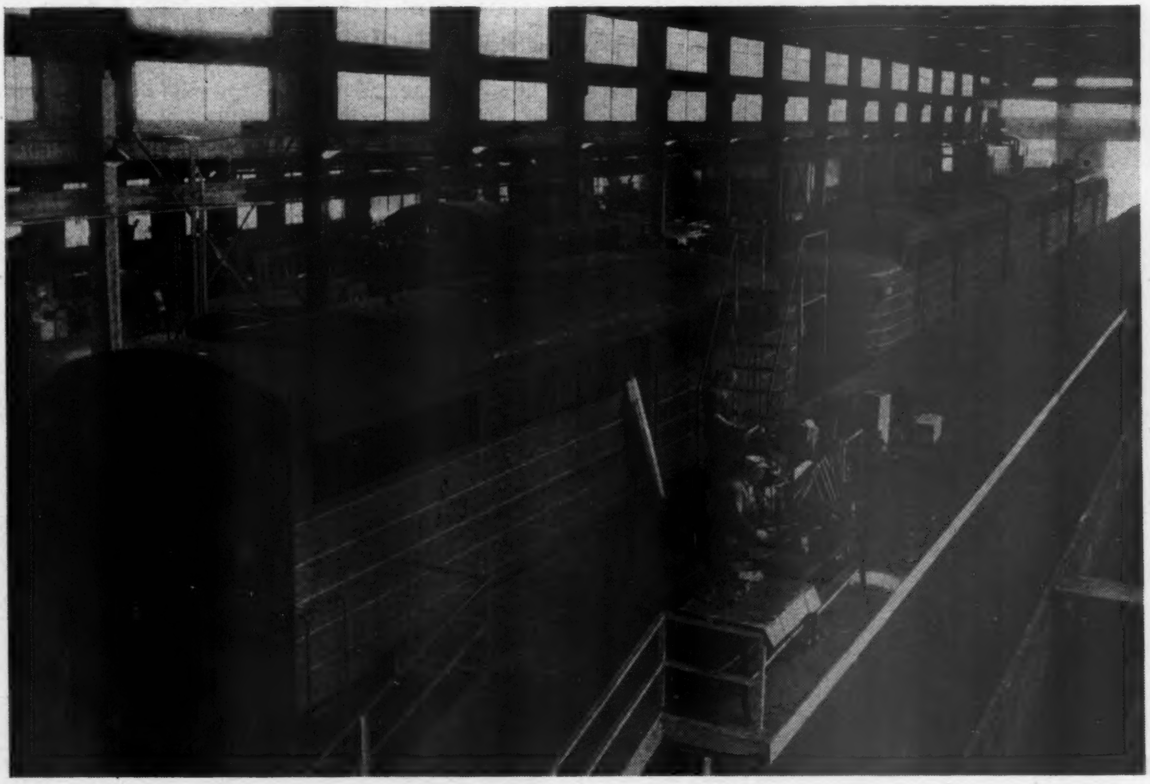
The spot system was put in effect July 5, 1947. During the first three months of 1947, the total number of N. & W. cars repaired at Bluefield was 4,006. Without increasing the working force, the total number of N. & W. cars repaired at Bluefield during the first three months of 1948 was 4,839, an increase of 833 cars, or 20.7 per cent. The amount of heavy car repair work increased during the same two periods by 17.8 per cent. It is conservatively estimated that the overall gain in car repair efficiency with the spot system is 25 per cent.



The rip-track repairs at Bluefield are concentrated in a small paved area

# New Haven Diesel Repair Shop

**Converted shop serves the New Haven, Conn., area for the repair and inspection of 4,500-hp. road freight power and switching units**



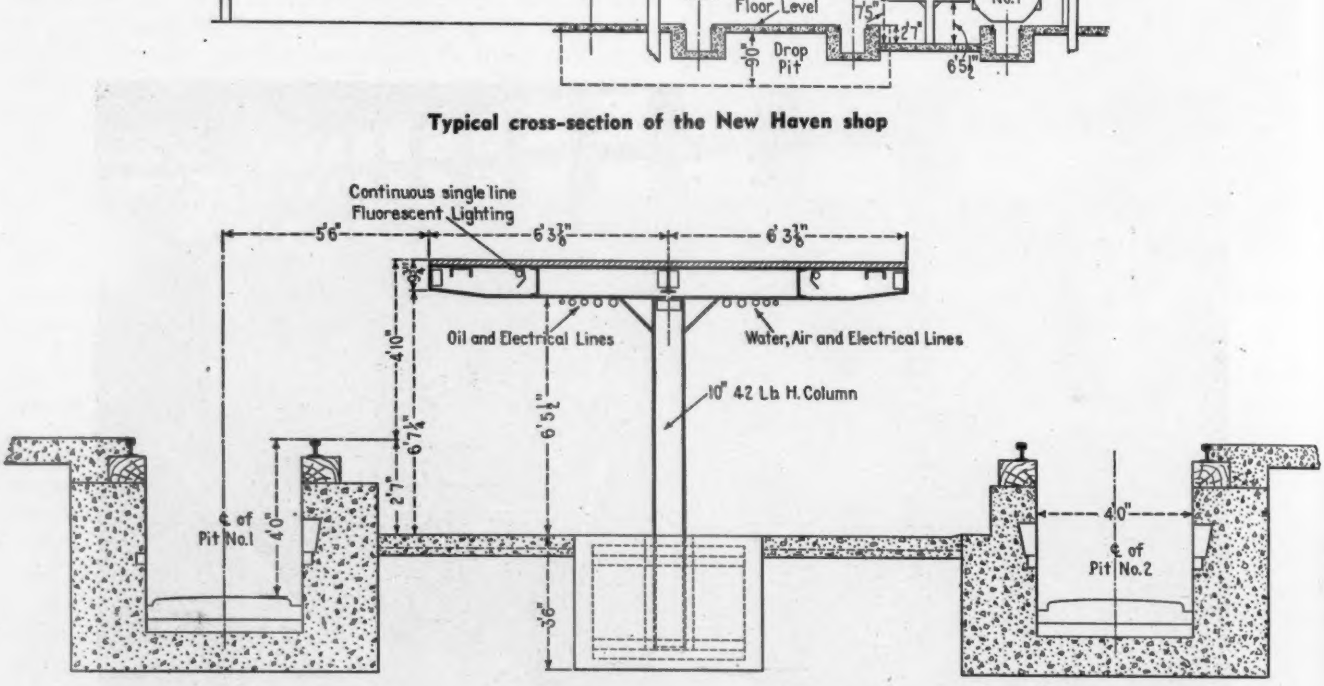
Within the past year the New York, New Haven & Hartford has concentrated the servicing and repair work on a fleet of 4,500-hp. Diesel-electric road freight locomotives and a number of Diesel-electric switching locomotives operating in the New Haven, Conn. area at a recently-converted Diesel-electric repair shop which was adapted to running-repair work on this type of motive power by remodeling a former heavy freight-car shop. The Diesel shop is located near the New Haven passenger station and is approached from the main line at the west end of the New Haven yard.

**Interior of the machine bay looking south**

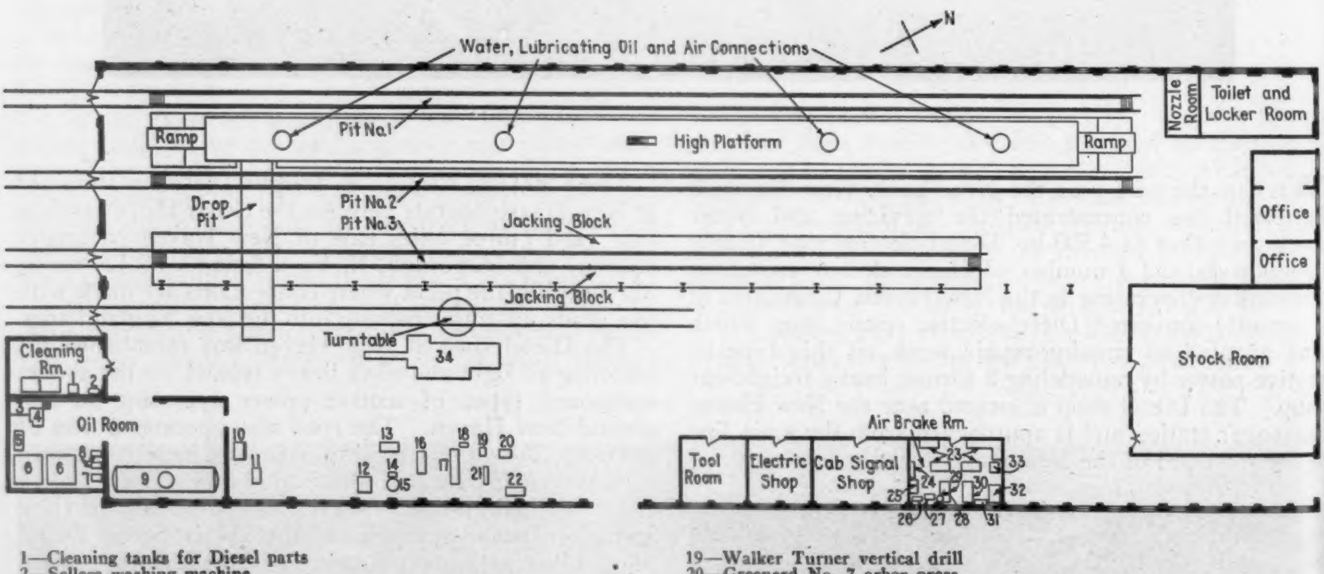
The 4,500-hp. Alco-G. E. freight Diesels maintained at New Haven operate between the Cedar Hill classification yard (three miles east of New Haven passenger station) and Maybrook, N. Y., a distance of 124 miles. Maybrook is the point where connections are made with five roads for traffic coming into the New England area.

The Diesel shop at New Haven was established for handling all light and some heavy repairs for the above-mentioned types of motive power operating in and around New Haven. The road also operates a fleet of 2,000-hp. Alco-G.E. road passenger Diesels between New Haven and Boston, Mass. and between New Haven and Springfield, Mass. These locomotives are serviced and given running repairs at the Dover Street Diesel Shop (Boston) and are merely turned, with routine inspection, at New Haven. General repair work on all Diesel-electric locomotives assigned to the west end of the railroad is handled at the main shop at Van Nest, in the city of New York, which was originally built for the repair of the New Haven's electric locomotives and has now been adapted to the additional work incidental to the overhauling of the Diesel power plants of the newer type locomotives. General repair work on other Diesel-electric locomotives will be taken care of at Readville locomotive shop (near Boston) as soon as necessary shop rearrangement and equipment can be completed.


**Typical cross-section of the New Haven shop**




**Section showing platform and working pits**




1—Cleaning tanks for Diesel parts
2—Sellers washing machine
3 and 4—Youngstown-Miller oil purifier
5—Tank for reclaimed oil
6—3,600-gallon storage tanks for reclaimed oil
7—Motor-driven unloading pump
8—Motor-driven dispensing pump
9—10,193-gallon storage tank for new oil
10—Battery-charging panel
11—Motor-generator set for battery charging
12—Ingersoll-Rand six-cylinder motor-driven air compressor, 870 r.p.m., 110-lb. pressure
13—Do-All Model 336 band saw
14—Cabinet for Do-All saw accessories
15—Air receiver
16—Carlton 4-ft. radial drill
17—Le Blond 18-in. by 60-in. engine lathe
18—Bridgeport double-floor grinder
19—Walker Turner vertical drill
20—Greenerd No. 7 arbor press
21—Sheldon 9-in. by 36-in. bench lathe
22—Bridgeport double-floor grinder
23—Air-brake repair benches
24—Cabinet
25—Foreman's desk
26—Ingersoll-Rand two-cylinder air compressor
27—Washing tank for air brake parts
28—Strainer-cleaning equipment
29—Air-brake repair bench
30—Feed-valve and governor rack
31—Vent-valve rack
32—Westinghouse 4-C test rack for locomotive brake equipment
33—Westinghouse test rack for AB equipment
34—Sellers 50-in. car-wheel lathe arranged for mounted wheel and traction-motor assemblies

**Key to Equipment Location on New Haven Diesel Shop**

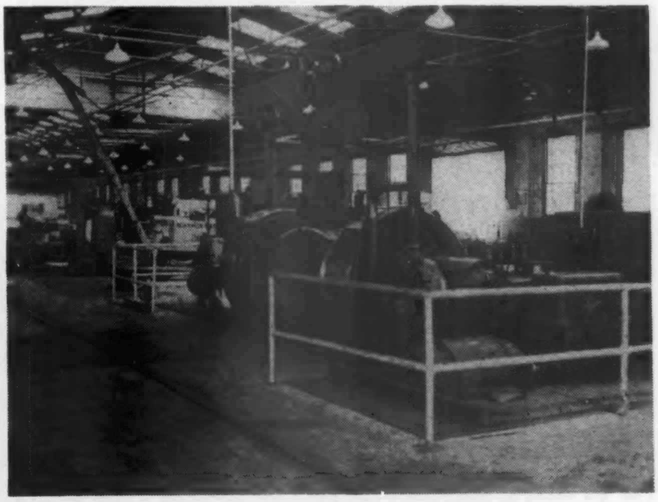
### Arrangement of the Shop

The general arrangement of the Diesel shop at New Haven consists of two bays, a work or erecting bay and a machine bay, each approximately 65 ft. in width. In the work bay there are three standard gauge tracks, all with pits. Two of the working tracks, between which is an engine-deck-level platform with ramps at both ends, have pits 304 feet long and the third working track has a pit 260 feet long. These tracks are on 24-ft. centers. The work floor between Tracks 1 and 2 underneath the platform is 2 ft. 7 in. below the top of the rail and the deck of the platform is 4 ft. 10 in. above the top of the rail. The clear headroom underneath the platform is 6 ft. 5½ in.

Near the south end of the shop, underneath Tracks 2, 3 and 4, there is a Whiting drop table by means of which wheels that are removed may be transported from Tracks 2 or 3 to Track 4 which serves the wheel lathe. At the wheel-lathe location there is a 96-in. Whiting shop turn-table. The wheel lathe, a modern Sellers 50-in. machine, handles mounted wheel sets complete with the traction motors and gearing.

At the north end of the working bay are the offices, wash and locker rooms and a fuel-nozzle repair and testing department. On the east side of the shop from the south end and toward the north, are the parts cleaning and oil rooms, battery charging floor and machine shop and an outside trucking entrance. Continuing north are wire-mesh-enclosed rooms for tool and electric repairs, cab-signal repairs, air-brake work and welding. The stores-department stock room, exclusively for Diesel parts, is at the north end of the work bay. A water rheostat, similar to that described in *Railway Mechanical Engineer,* March, 1943, page 137, is located outside the south end of the shop for load-testing power plants in locomotives that require it.

**Portable rack designed for holding assemblies of cylinder liners, pistons and connecting rods**



**The 50-in. Sellers car-wheel lathe is designed to handle mounted wheel and traction-motor assemblies**

**South end of the platform between Tracks 1 and 2 — Motor-driven pump for draining the sump is shown at the left**

**The working space underneath the platform is clear because the platform supports are at the center—fluorescent lighting fixtures and pipe lines are suspended underneath the platform**

### Design of Pits and Platform

In the design of the working pits especial attention was given to light and drainage. Incandescent lamps, recessed in the pit walls and staggered as to location give adequate illuminaton for workng underneath the locomotive running gear. Underneath the platform, between Tracks 1 and 2, fluorescent lamps are continuous the full length of the platform.

The pits have crowned floors with drain troughs at either side below pit floor level so that workmen do not have to work at any time in standing water. At the south end of the shop the pits drain into a sump from which the water is removed by a motor-driven pump to an outside sewer.

The platform between Tracks 1 and 2 is supported by a single row of columns at the center. This design leaves the working area under the platform adjacent to the running gear of the locomotive unobstructed the

full length of the platform. Electrical conduits and the fluorescent fixtures are suspended beneath the platform. Air, lubricating oil and water outlets are located at four points on the platform about 70 ft. apart. The water and air lines are 1½ in. and 1¼ in. respectively and the lubricating oil line is 2 in.

### Ventilation and Fire Protection

The work bay is cleared of smoke and combustion gases from Diesel engines of locomotives that are being run in the normal course of repair work by means of six ventilators, staggered in two rows of three each, in the roof. These ventilators are the Powermatic Ventilator Company's 36-in. units having a capacity of 1,680 c.f.m. and driven by a 2-hp., 1,750-r.p.m. motor.

Fire protection is afforded by a complete sprinkler system in both bays of the shop, carbon dioxide portable extinguishers at various locations throughout the shop and fog nozzles on all fire hose.

**The air room is completely equipped for handling Diesel-electric locomotive brake equipment**

### Lubricating-Oil Supply System

The oil supply system for the shop embodies equipment only for handling lubricating oil. There are no fuel oil supply facilities in the shop as fuel is supplied to the locomotives at an engine terminal fueling station located nearby. The lubricating-oil supply system consists of equipment for handling new oil and for reclaiming used oil.

New oil is taken from tank cars and stored in a 10,193-gallon tank in the oil room. This tank is equipped with steam-heating coils underneath the tank.

**Portable cart with complete sets of tools required for special jobs**

A 25-ft. flexible steam hose supplies steam to tank-car connections outside the shop where incoming tank cars are spotted at the oil line connections.

The oil is pumped from the tank cars to the storage tank through strainers by a motor-driven pump of 100-

### Monthly Inspection Report Form—4,500-Hp. Alco-G.E. Freight Locomotive

**Mechanical**

| Item | Work Done By: |
|---|---|
| 1—Check for blowby-audible test | |
| 2—Check cylinder heads and rocker boxes—valve clearance | |
| 3—Check crankcase | |
| 4—Change engine-room air filters | |
| 5—Change turbo-supercharger air-intake filters | |
| 6—Change lubricating-oil filter cartridges | |
| 7—Change turbo-supercharge oil-filter element | |
| 8—Change fuel-oil filters | |
| 9—Check lubricating-oil lines | |
| 10—Check fuel-oil lines | |
| 11—Check shutters—apply Kysor fluid | |
| 12—Check auxiliary-generator gear-case level | |
| 13—Check fuel- and governor-oil transfer pump | |
| 14—Check gauges at engine station | |
| 15—Check racks for stickiness | |
| 16—Check lubricating oil and water hose | |
| 17—Check overspeed trip (1,080-1,100 r.p.m.) | |
| 18—Check governor settings (350-1,000 r.p.m.) oil and linkage | |
| 19—Change air-compressor crankcase oil — every second month | |
| 20—Clean governor-oil filter element | |
| 21—Check turbo-supercharger rundown time | |
| 22—Check and lubricate doors, locks, handles, etc. | |
| 23—Test lubricating-oil sample | |
| 24—Check bell and horn | |
| 25—Check engine-generator coupling for noise | |
| 26—Check radiator fan and drive | |

**Mechanical—Air Brake**

| Item | Work Done By: |
|---|---|
| 1—Make air-brake test (before engine is shut down) | |
| 2—Three- or six-month test, if due | |
| 3—Adjust travel-change shoes as necessary | |
| 4—Lubricate slack adjusters and pins | |
| 5—Check air-compressor governor | |
| 6—Clean air-compressor filters | |
| 7—Check intercooler safety valves | |
| 8—Check control-air pressure | |
| 9—Check hand brake—lubricate | |
| 10—Check windshield wiper | |
| 11—Check brake rigging and trucks | |
| 12—Check journal boxes | |
| 13—Check wheels | |
| 14—Check equalizers | |
| 15—Check grab handles and steps | |
| 16—Check draft gear and uncoupling mechanism | |
| 17—Check cab-signal brackets, etc. | |
| 18—Check all air hose on locomotive, including spares | |
| 19—Clean air-compressor breather | |
| 20—Check oil in air compressor | |
| 21—Check emergency tool equipment | |

**Electrical**

Item

1—Check battery ........ Cell No. ........ Gravity ........
Temperature (Deg. F.) ........
Water added ........ qts. Cell No. ........ Gravity ........
Temperature (Deg. F.) ........

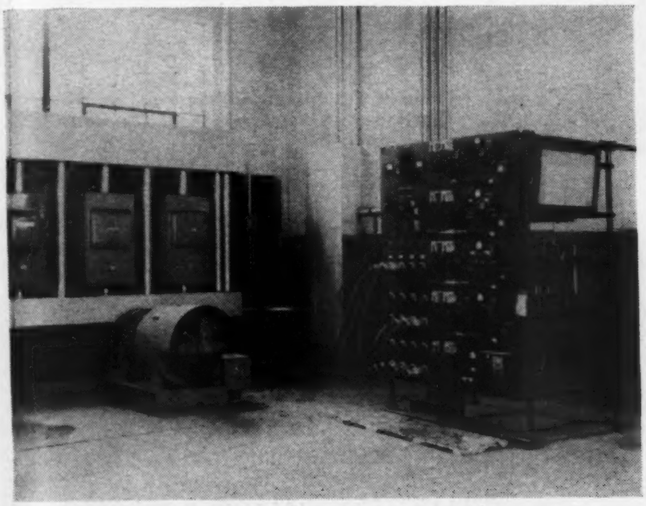
| Item | Work Done By: |
|---|---|
| 2—Make insulation test | |
| Control circuit | |
| Blower circuit | |
| Power circuit | |
| (Blow out all electrical equipment on locomotive except covered relays) | |
| 3—Check main exciter and both auxiliary generators and connections | |
| 4—Check power cabinet | |
| 5—Check engine-station cabinets and controls | |
| 6—Check traction motors, lubricate as necessary | |
| 7—Check master controller and safety control switch | |
| 8—Check engine governor | |
| 9—Check defroster and heater motors | |
| 10—Check fuel- and governor-oil motor | |
| 11—Check high-temperature switch | |
| 12—Check traction-motor blower motors | |
| 13—Check lubricating-oil pressure switches | |
| 14—Check fan control | |
| 15—Check eddy-current clutch | |
| 16—Check 400-cycle motor-generator set | |
| 17—Check exhauster motor | |
| 18—Check alarm circuits | |
| 19—Check dynamic-brake blower and grids | |
| 20—Check auxiliary generator voltage ........ found ........ volts | |
| 21—Check all lights on locomotive | |
| 22—Lubricate electro-pneumatic contactors | |
| 23—Lubricate reverser, controller, brake switch and gear segments | |

**Miscellaneous**

| Item | Work Done By: |
|---|---|
| 1—Drain water from fuel tank | |
| 2—Check hopper condition and operation | |
| 3—Check fire extinguishers | |
| 4—Check sander from sander switch forward and reverse | |
| 5—Check and repair all fuel-oil leaks | |
| 6—Check and repair all lubricating-oil leaks | |

g.p.m. capacity. Two other pumps, of 20 g.p.m. capacity, used for dispensing the oil to the shop lines may also be used for unloading tank cars, if necessary. The oil room piping is so designed that new oil may be pumped to the shop lines; reclaimed oil may be pumped to shop lines or any proportion of new and reclaimed oil may be pumped into the shop lines.

When crank-case oil is drained from the Diesel engines, either at this shop or at outlying points in the district served by this shop, it is placed in drums, samples are taken for the test-department laboratory, and the drums are sent to the oil room. The lubricating oil reclamation system at the New Haven shop consists of



The battery charging panel and motor-generator set at the south end of the machine bay

a Youngstown-Miller oil purifier through which the oil from the drums is passed and stored in two 3,600-gallon tanks. From the purifier the oil passes through filters to remove the Fuller's earth and thence to storage tanks to await results of laboratory analysis before being put into the main 3,600-gallon reclaimed-oil storage tanks or rerun through the purifier, if necessary. An additional tank, of smaller capacity, is also in the reclaimed-

Fuel nozzle testing department—one of the racks for holding nozzles is seen on the bench at the left

oil supply line and is so arranged that small quantities of oil may be drawn off into containers at four outlets. The outlets of the two 3,600-gallon tanks are connected to the suction side of two motor driven dispensing pumps, the discharge sides of which are connected to the shop lines.

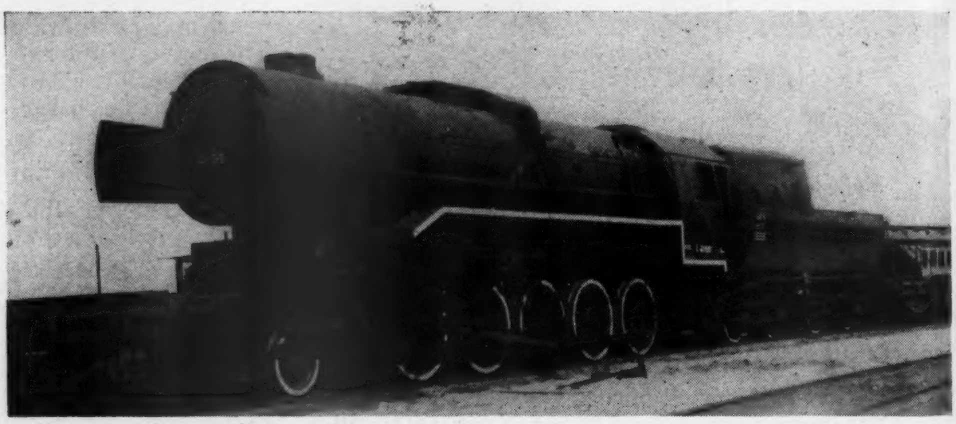
### Maintenance System

All locomotives that are maintained at the New Haven shop, as well as at other system shops, are brought to the shop for service and repairs on a time and mileage basis. Owing to the pooled operation of the locomotives and the relatively short runs (157 miles being the maximum) the monthly inspection and repair is performed on this basis about every 7,000 (locomotive) unit-miles.

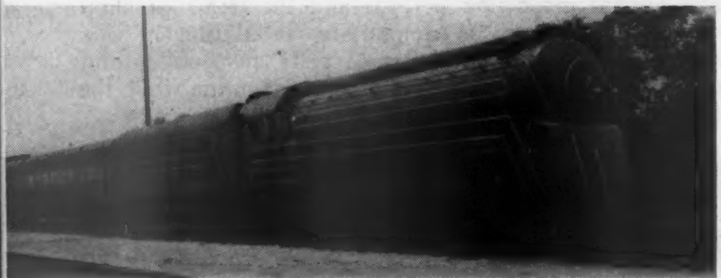
Trip inspections and light repairs are made at the Cedar Hill and Maybrook engine terminals. Repair work coincides with monthly, quarterly, semi-annual and annual inspection periods and the items of shop work shown in an accompanying tabulation in this article indicate the character of tests, inspections and maintenance that is part of the regular routine while the locomotive is at the shop.

# The Chicago Railroad Fair

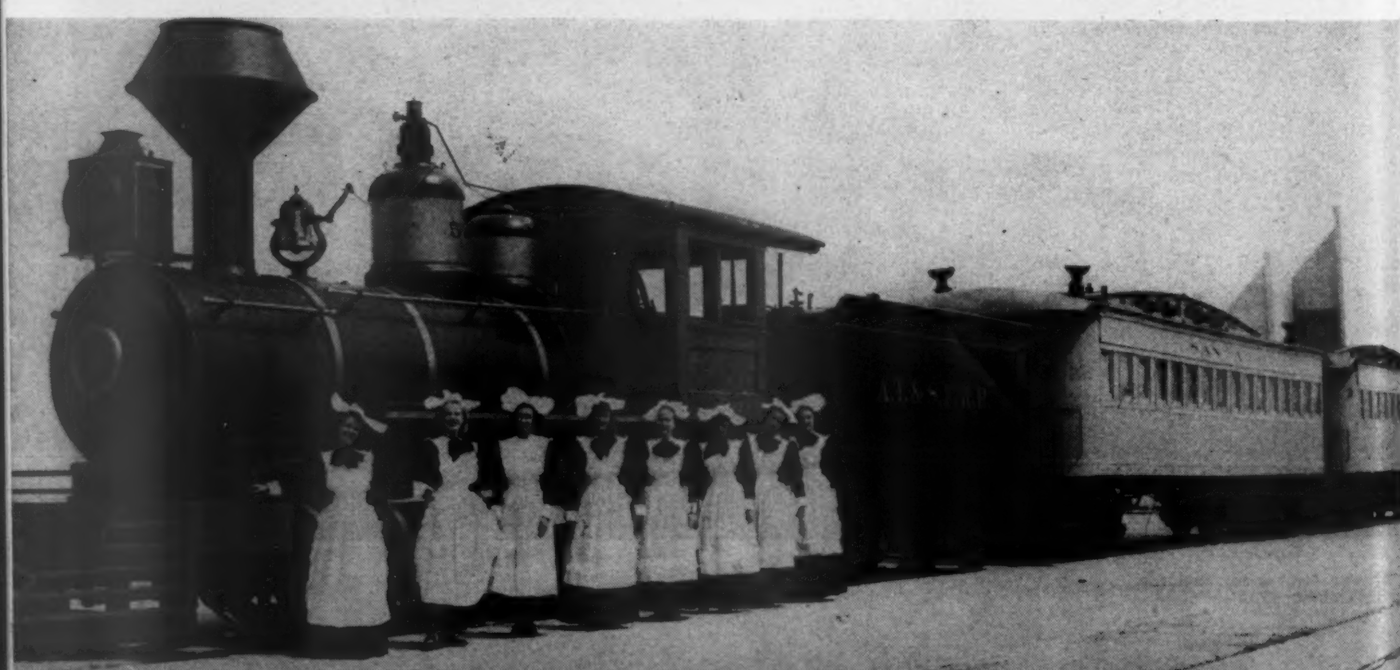
Some of the railroad rolling stock on the four miles of display track at the Railroad Fair



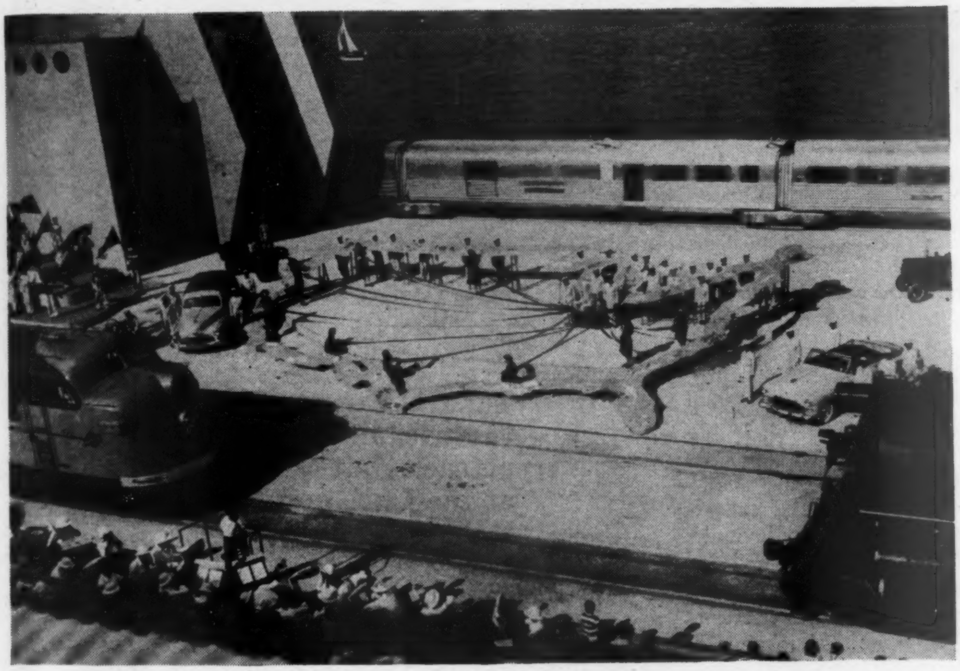
Right: European locomotive design is represented by this German locomotive built during the war—Below: Baltimore & Ohio "Cincinnatian" Pacific heads the eastern railroads' composite passenger train



Actresses appearing in "Wheels A-Rolling" pageant pose as Harvey Girls in front of an old-time Santa Fe train



**Below: Interior of the Milwaukee's Hiawatha observation parlor car with sky-top solar lounge equipped with heat- and glare-resistant triple-pane glass**



**Above: The Army Transportation Corps' contribution to the exhibit is a machine-shop car—**

**Below: Atmosphere of the Santa Fe railway country is depicted by Navajo silversmiths turning out hand-wrought silver belt buckles, clips, bracelets, rings, etc.**

**Above: In the finale of "Wheels A' Rolling," the central attraction at the fair, a modern steam and a Diesel locomotive meet in the center of the stage with a Burlington Zephyr of 1934 in the far background—A map of the United States is assembled in the center to show the role played by transportation in welding the nation together**

# Burlington Car-Roof Washer

The operator in the control cabin watching a roof and two eave brushes at work

**Tandem car washer with roof-cleaning equipment at each unit is installed at the Chicago terminal. Will clean Vista Domes**

THE Chicago, Burlington & Quincy has recently installed at Chicago and will soon have in service at Denver, Colo., a Whiting tandem car-washing machine, each unit of which has been equipped with a three-brush roof washer designed to clean streamline passenger-car roofs, including the Vista Domes. This development was brought about by the advent of dome cars and resultant need for keeping the domes, dome windows and car roofs, as well as car sides and side windows, thoroughly washed at minimum expense and in the short turn-around time usually available.

In the case of train No. 22, for example, the Morning Zephyr from Minneapolis, Minn., usually has seven cars, including four new Vista Dome coaches and a Vista Dome parlor car, and is due in Chicago at 2:40 p.m., central standard time. This stainless steel train is scheduled out on the return trip at 4:00 p.m. which allows a maximum of only 80 minutes for all servicing, cleaning and switching operations. Considering that this and other Burlington streamline trains have to be inspected in the yard, checked by electricians, refueled, and watered, diner supplied and all cars cleaned inside, the time available for exterior cleaning is definitely limited, to say nothing of the difficulty in getting an adequate force of car cleaners for this major operation under present labor conditions in a large industrial center.

### To Wash Over 200 Cars a Day

With the Whiting car washer and roof-washing attachment, the domes, roofs and car sides are washed in a single pass through the machine at the rate of about 1½ min. per 85-ft. car, or 22 min. for a 15-car train. A four-man crew is used to operate the washer on each of two 8-hr. shifts. At present, 100 to 150 cars a day are washed in the machine, but it is expected that this output will be stepped up shortly to 155 main-line cars and 56 suburban cars, or 211 cars a day. Major advantages secured with the mechanical car washer include more favorable public reaction to clean cars; reduced cleaning time and hence shorter turn-arounds; cleaner and dryer working conditions by removal of the car-washing operation from train yards where all other servicing must be done.

Burlington streamline trains are normally washed every day which lightens individual cleaning operations and permits using clear water except on occasional dirty cars when a one-half strength or full-strength cleaning solution is used in the leading washer unit, as required. Diesel road-locomotive front ends and front windows are automatically sprayed and hand brushed. The locomotive bodies pass through the washer with side brushes in operation and roof brushes retracted. In the case of steam locomotives and Diesel switchers, all brushes are retracted.

The Whiting tandem car-washer units are spaced about 150 ft. apart and all water and solution sprays, as well as two long side brushes and one short window brush on each side of each unit, are operated by one man from a single control house just ahead of the lead washer. The roof brushes, however, require one man at a control station

high enough on each unit to watch the brushes pass automatically along the car roofs and over the domes, but raise them by pneumatic control whenever projections like ventilators, radio antennae, etc., come along. This means that two operators are normally required for operation of the tandem washer with roof-cleaning attachment. In addition, a car cleaner with a long-handle brush stands on each side of the lead washer unit as the train passes and scrubs manually the locomotive front end, vestibule doors, truck skirting, observation end and other parts inaccessible to the brushes.

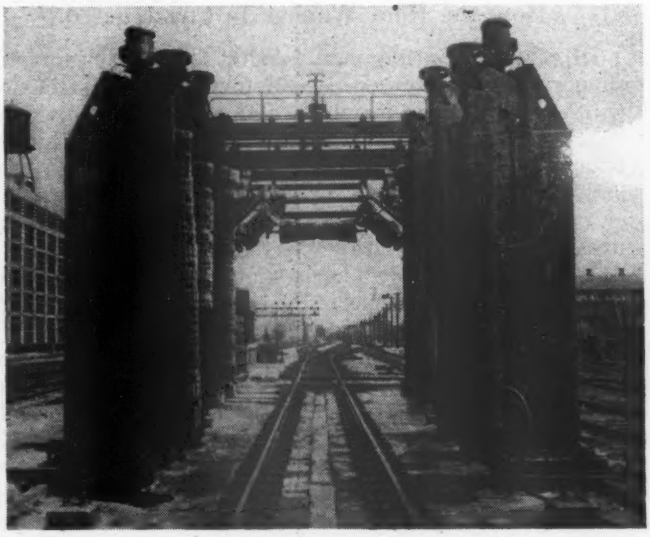
### Location of the Car Washer

The car washer is located on a suitable section of straight spur track just west of the Twelth street, Chicago, yard where passenger trains are normally serviced. The trains are turned on a wye and pulled or pushed westward through the car washer, at present arranged for one-direction washing, by either Diesel or steam locomotives. On completion of the washing, trains proceed into the coach yard or Union Station as the case may be, without an extra movement which would involve additional delay and switching expense.

The six-brush side-washing machine, which is the basis of the new installation on the Burlington, is standard Whiting equipment with steal beam supports for side and window brushes mounted in self-aligning roller bearings in pivoted arms which are moved towards or away from the car sides by double-acting pneumatic cylinders operated by a straight-air valve at the control station. The side brushes are 10½ ft. long with the upper ends 13¼ ft. above the rail top to cover the highest Diesel locomotive side. The brushes are 18 in. in diameter, except the upper and lower end sections which are 24 in. in diameter, or slightly larger to give a better contact with inward curving locomotive or car sides.

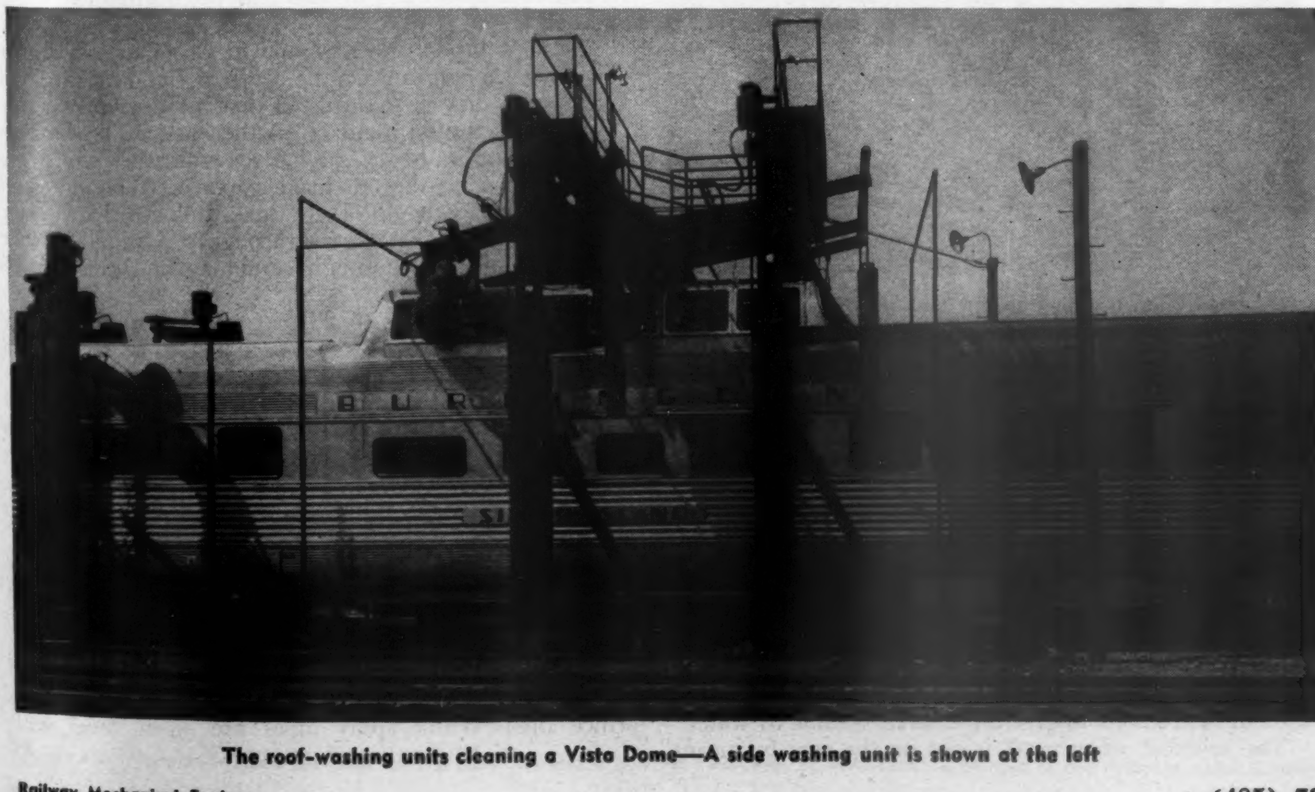
The Fullergript brush sections with plastic cores and Tampico long fibers, overlap slightly for uniform cleaning and are V-belt driven from 3-hp. electric motors at a speed of 240 r.p.m. They are flexibly mounted so as to adjust themselves to car sides which, for one reason or another, may incline slightly. Adequate brush application pressure is secured with 30 lb. air pressure in the double-acting pneumatic cylinders. The weight of the brush assembly is carried from the top bearing for greater sensitivity. Suitable vertical spray pipes with evenly-spaced nozzles are installed just ahead of and behind each washer unit and in the spray guard back of each brush.

The control station for side washers is conveniently located in an 8-ft. by 38-ft. brick service building about 15 ft. ahead of the lead washer unit and designed to include an operator's room with bay window for good visibility up and down the track, air-pump room, locker facilities and basement. The latter is furnished with an oil-fired hot-water heater, fuel tank and air reservoir, also one 2,300-gal. solution storage tank and two 150-gal. use tanks which are connected by pump and piping to supply either full- or half-strength solution to the spray pipes as desired by operating valves in the control station.



A car-washing station with the roof washer at the rear

Some track rearrangement was required for flexible movement of trains to and from the washer without inter-



The roof-washing units cleaning a Vista Dome—A side washing unit is shown at the left

fering with normal operation. The washer is located on Track 6 and there is room for two trains east and west of the washer on Tracks 5 and 7. All steel work is mounted in substantial concrete foundations and that part of the track where car washing occurs has a 19-ft. by 100-ft. concrete sloping drain pan at each washer unit, with center drains and suitable connections to the sewer.

### How the Roof Washer Is Constructed

In the roof washer attachment, the steel beam side supports are strengthened, tied together across the top with steel framing members and the three individual, motor-driven brushes installed in counterweighted hinged frames in such a way as to be readily lowered to bear under predetermined air pressure against the car roof, or raised to clear the upper parts of all cars and locomotives. The maximum clearance is about 18 ft.

The brushes include a horizontal roof brush 81 in. long by 18 in. in diameter, except the end sections which are 24 in. The two 3-ft. by 18-in. and 24-in. long and two 3-ft. sloping eaves brushes, like the horizontal brush, are positioned ahead of the conventional side brushes and operated from a control station at roof level on the outer side of the washer frame. The eaves brushes are adjustable in angular position for most effective washing of either flat or curved dome side windows. A permanent steel step ladder gives easy access to the control station and cat walks are constructed across the top for inspection of brushes, lubrication, etc.

**Roof brush traveling up the front of a Vista Dome**

The first unit of the tandem washer is used to apply either water or cleaning solutions and to scrub the car surface. The second unit is used with clear water only. The cleaning solution used consists of Oakite No. 88, one drum of which is mixed with water in the 2,300-gal. tank and thence distributed in full strength to one of the 150-gal. use tanks and diluted 50 per cent in the other. The solution strengths are generally equivalent to 4 ounces or 2 ounces per gal. of water, respectively. About 3 gal. of solution are required per car and 300 to 400 gal. of water. The water pressure is 40 lb. per sq. in. but perhaps more important than the pressure is adequate pipe size without restrictions to give the desired volume of water.

The solution, when used, is put on the cars by means of spray pipes located just in advance of the first brush unit. The rotating brushes then scrub in the solution. It takes about one minute for the car to pass from the first brush unit to the second unit, where clean water is applied by the rotating brushes and rinsing sprays. The time interval between the two units is just enough to permit the solution to cut dirt but not damage the car finish.

**C. B. & Q. streamliner in the tandem car washer at Chicago**

As a train approaches the first unit, the brushes are in their retracted position to provide clearance for the locomotive. When the locomotive has passed through, side brushes are advanced or continued in operation, as the case may be. An operator in the control station on each washer unit then lowers the roof brushes and raises them to pass roof obstructions except domes which they pass over automatically. The side brushes are advanced by compressed air and the roof brushes also, but the table supporting the latter may be raised or lowered by electrically-operated screws. Both side and roof brushes are moved until they come into the correct preset position. Brushes are preset 2½ in. less than the normal car width and height.

The roof brush, the first one to be contacted, comes down low enough to wash the roofs of standard cars and at the same time is so adjusted that it rides up over the front, along the top, and down the back of the domes. The same applies to the sloping eaves brushes which are the next two brushes to make contacts. The side and window brushes then do their work, followed by a water spray. The train then passes through the second washer unit which does a thorough scrubbing and rinsing job with clear water.

The brushes used with this car-washing machine have long soft bristles which give a mopping rather than a scrubbing action. The individual sections are easily renewable without disturbing adjoining sections. Long side brushes and eaves brushes are rotated against the direction of car movement and the window and roof brushes with it. The brushes are not allowed to revolve if, for any exceptional reason, the train stops. These brushes have an average service life of about six months. The solution nozzles are checked every day and all moving parts of the washer are inspected and lubricated in accordance with a prescribed program.

Solution spray pipes and connections are made of ½-in. brass to assure reasonably long service life. Standard orifice size is maintained by means of easily-replaceable orifice tips. Water spray pipes are ¾-in. steel with

(*Continued on page* 76)

Treatment and Control of

# Diesel Radiator Water

**By Charles W. Brown Jr.***
**and D. G. Drawbaugh, Jr.***

**An accurate control method set up by Western Maryland test department eliminates both corrosion and scaling**

THE treatment of water for cooling purposes in Diesel radiators is an important phase of maintenance which should be considered by all railroads operating Diesel locomotives. Among the troubles encountered in Diesel radiators are scale, sludge formation, and corrosion. These conditions should not be tolerated for they can be prevented by the control and treatment of the radiator water.

The cooling system of a Diesel is a type in which practically no evaporation takes place; hence, the water does not concentrate. Make-up requirements to a system of this type are small and are limited essentially to a small amount of leakage. Because there is no concentration the problem of scale formation is not too great if soft water is used for make up and the pH or the hydrogen ion concentration is not too high. Corrosion is the main problem. Certain surface-active agents prevent scale formation. For preventing corrosion, materials possessing the property of rendering the metal surfaces passive are best suited and are economically used. Slime, a problem encountered in other types of circulating systems, does not affect a system of this particular type. If the system is free of corrosion, scale, and sludge, no troubles should be encountered.

### Water Treatment

The various Diesel manufacturers recommend water treatment but do not give any specific information other than to suggest the use of the products offered by several leading water-treating companies. The American Railway Engineering Association also recommends that the water used in radiators be treated.

The compound used on the Western Maryland was developed by the engineer of tests in collaboration with a well-known water-treating company. The powdered compound so developed is adjusted or buffered to maintain a constant pH value, and where even a water of as high as six grains per gallon hardness is used there will be no scaling or softening to form a sludge. Corrosion is inhibited by a certain amount of a chromate in accordance with A.R.E.A. recommendations. The concentration of the chromate ion in solution provides the most exacting method of test at the present time.

Since the compound contains chromate, a yellow or yellow-green solution will form when the compound is added to the radiator water. This yellow color is a basis for a rough check as to the concentration of the solution, but it is a rough check only. A visual color observation is unreliable to determine if insufficient compound or too much compound has been added to the radiator water.

### Radiator-Water Tests

The test department of the Western Maryland receives each month samples of radiator water from every Diesel, on which tests are made and reports with recommendations are prepared. If the water sample is cloudy or has sediment, the sample is filtered before the test is made.

In making the test 25 milliliters (25 mls.) of the Diesel radiator water are pipetted into a casserole and acidified with 5 mls. of a 50-per-cent solution (by volume) of sulphuric acid. Then 10 mls. of a 20-per-cent solution of potassium iodide are added. Stir well and allow to stand for about two minutes. A brown color of iodine is so developed. Titrate with a N/10 solution of sodium thiosulphate until the brown color almost disappears. Then add about 1 ml. of fresh starch solution, or a specially

*Engineer of tests and chemist, respectively, Western Maryland, Hagerstown, Md.


**A Western Maryland Diesel heading for the terminal and a general check-up, at which time a sample of the radiator water is taken**

prepared starch solution, whereupon a dark blue color will form. Continue the titration carefully until a clear blue solution forms. This is the end point; it is clear, sharp, and distinct. The number of millimiters of thiosulphate used is read and recorded.

To apply the result obtained a set of formulas has been devised by the authors to enable one to make simple calculations for overtreatment or undertreatment. The starting point is the preparation of a solution according to the manufacturer's recommendations. Samples of this solution are run as specified above, so that the millimiters of

**A section of the Western Maryland's laboratory—The Solutions and burette used in testing radiator water are shown on the white stand at the left**

thiosulphate required for the desired concentration will be known. This figure remains constant for a particular compound. The compound used by the W.M. is used at the rate of 0.25 ounce per gallon. A solution made up to this concentration will require 8.0 mls. of sodium thiosulphate as described in the above test procedure. This figure of 8.0 is the basis of the calculations involving both overtreatment and undertreatment of radiator water. As it is difficult to maintain the figure at 8.0, the laboratory maintains limits from 7 to 9 mls. of thiosulphate solution. Due to the nature of the compound, we do not, at present, feel that overdosage will cause any trouble. It would, however, seem advisable to set limits as suggested.

### Water Control

Two formulas have been devised; one for overdosage and the other for underdosage of the water-treating compound. To calculate the number of gallons to be drained due to overdosage the formula is:

$$\frac{\text{mls. thio. used} - 8.0}{\text{mls. thio. used}} \times \text{radiator capacity}$$

As an example, suppose that the test shows 9.8 mls. of thiosulphate were used and that the radiator has a capacity of 240 gallons. Applying the overdose formula as shown above, calculate as follows:

$$\frac{9.8 - 8.0}{9.8} \times 240 = 44 \text{ gals. to be drained and refilled with water}$$

Soft or condensate water should be used in the Diesel radiator whenever possible. Zeolite-softened water is permissible if the total dissolved solids do not exceed 23 grains per gallon. Certain waters may justify the installation of deionizing units in which all ions, both positive and negative, are removed to produce a water of distilled-water quality.

A factor must be developed to calculate the number of ounces of compound to be added when undertreated. This factor depends upon the radiator capacity and the ounces required which will vary depending upon what product is being used. Once established, it is a simple matter to figure from the result of the test exactly how much more compound should be added to water in the radiator. This factor is obtained by dividing the ounces required for each particular radiator by the figure 8.0. This is the figure obtained by titration of the standard solution of the particular product used by the Western Maryland.

This product will give the following factors:

| Radiator Capacity, Gals. | Ounces Required | Factor |
|---|---|---|
| 80 | 20 | 2.50 |
| 220 | 55 | 6.88 |
| 230 | 58 | 7.25 |
| 240 | 60 | 7.50 |
| 250 | 63 | 7.88 |
| 290 | 73 | 9.13 |
| 300 | 75 | 9.38 |

To calculate number of ounces of compound for undertreatment the formula is:

$$8.0 - \text{mls. thio. used} \times \text{factor}$$

As an example, either from leakage or failure to add enough compound one may obtain a titration figure of 5.0 mls. of thiosulphate solution. The radiator capacity is 220 gallons. Applying the above formula:

$$8.0 - 5.0 \times 6.88 = 20 \text{ ounces to be added}$$

That corrosion and scale will result without proper treatment can be definitely proved by normal everyday operation. That both can be prevented may also be definitely proved. The subject of Diesel radiator water treatment is well worth the attention of Diesel users.

The W.M. test department finds these tests and calculations to be of great value and after one has become familiar with the test and calculations, it will be found an easy and reliable method of treatment and control of Diesel radiator water.

## Car Roof Washer

(*Continued from page* 74)

1/16-in. holes 3 in. apart. In the case of side spray pipes, located about 20 ft. from the exit side of each washer unit, spray nozzles are welded to the vertical pipe and extend to within about 10 in. of the car sides and windows, thus delivering water under pressure for final rinsing. These particular spray nozzles are tilted slightly so as to throw some water on the car vestibule ends.

All piping and electric cable is carried from the service house to the car washer units in a wood-covered tunnel 24 in. wide by 30 in. deep, which extends alongside the concrete drain pans. When below freezing in winter time, convenient arrangements are made to blow out all water and solution pipes in the tunnel and drain water to the sewer. Dependent upon wind velocity and various other factors, experience on the Burlington indicates that cars may be satisfactorily washed at temperatures down to about 24 deg. F. Under climatic conditions in Chicago, it is anticipated that the car washer will be operated 320 days a year.

# EDITORIALS

### Convention Time And Its Opportunities

Elsewhere in this issue will be found the programs of the Coordinated Mechanical Associations—Air Brake Association, Car Department Officers' Association, Master Boiler Makers' Association, the Locomotive Maintenance Officers' Association, and Railway Fuel and Traveling Engineers' Association. These groups, which make up the backbone of the mechanical-department supervisory staffs of the railroads of North America, meet this year under peculiarly favorable and significant circumstances. They have done a fine bit of organization work since 1939 and have lived up so well to the expectations of railroad managements that the General Committee of the Mechanical Division, Association of American Railroads, has recommended to member roads that each of them be well represented at the September 20 to 23 meetings of these associations which will be held at the Hotel Sherman in Chicago.

This year will represent the tenth year since these groups really got started again after the long period of idleness during the depression. In these ten years there has been developed a new conception of the character of association work which, contrasted with the type of work that was done by the pre-depression associations, has been instrumental in establishing the high standing which these several groups now enjoy in the railroad industry.

There has always been a place for the kind of "down-to-earth" work now being done by these associations in collecting the information relating to the best practices with respect to the servicing and maintenance of rolling stock and motive power and presenting it to the railroad world at large for guidance in improving performance on individual roads. The work, however, has only begun for there are ten opportunities now to one in the pre-war days for doing useful committee work in the proper field of these "minor" associations.

The Fuel Association, for example, not only should be but is doing something in the investigation of quality coal. Here is a problem that must be solved for the efficiency, performance and the cost of operation of steam power depend upon the answer. The Boiler Makers are working to find the answer to the high cost of boiler maintenance, which may be the ultimate answer to the economics of steam power. The Car Department Officers have the intricate maintenance problems of alloy steels, lighting, air conditioning and heating to deal with and the Locomotive Maintenance men the whole question of relating repair facilities and methods to the question of holding down locomotive repair cost. Never was there a time when so many railroad mechanical problems need a solution. The Mechanical Division has long been absorbed with matters of rolling-stock design and interchange and material specifications. These major considerations are affected by maintenance experience and it should be clear that the Coordinated Associations have a most important place in the industry by suggesting the changes that the Mechanical Division might act upon in the light of "out-on-the-line" experience. There need be no conflict of functions. Of course, these associations also exercise large influence on the effectiveness of maintenance practices.

### Mechanical or Electrical

An accumulation of circumstances has brought a number of Diesel locomotive maintenance requirements into sharp focus. When nearly all Diesels were switchers, things were relatively simple. With the introduction of road power, more attention was given to maintenance facilities, but roads with few locomotives, cannot afford to have elaborate Diesel repair shops; particularly is this true for electrical shops in which motors and generators are rewound. As the number of locomotives owned is increased, it has been the tendency of railroads to do more of their own repair work. As locomotive age increases, maintenance requirements rise to a certain level.

These circumstances have now combined to create a condition which makes interchange of ideas and comparison of practices of unusual importance. The several railroad associations interested in Diesel locomotives are the railroad's answer to this requirement. The associations have risen to this emergency and are doing valuable work. Some of this work is being done in unexpected places. An electrical association concerns itself with lubricating oil reclamation and a mechanical group undertakes to establish electrical inspection procedure.

These irregularities will apparently be worked out since arrangements have been made for making the Electrical Section, Mechanical Division, A.A.R., a part of the coordinated group of railroad associations. Nothing has been said about the Electrical Section, of the

Engineering Division, A.A.R. It does not deal directly with locomotive maintenance, but one of its responsibilities is shop and wayside facilities. There has long been some rivalry between the two electrical groups, but, this is basically a healthy condition. There is a very considerable overlap of membership, and it is to be expected that the two groups will work well together.

Once upon a time, it was possible to say, without fear of argument, "This is electrical, and that is mechanical", but now it takes a "sea lawyer" to make all the distinctions. Association work must be allocated, but it is not going to be possible to draw the lines very fine.

## Secondary Expense Stems Gain Importance

The railroad industry owes a debt to those who have been responsible for the development and installation of Diesel-electric motive power if for no other reason than that the introduction of this type of locomotive has forced the roads to study motive power operating costs. Actually more has been learned about such costs and the factors affecting them in the past seven or eight years than in several previous decades.

Railroad men have been looking at motive power operating expense figures for many years and because the items of wages, fuel, maintenance and lubrication have made up the major part of the total expense the greatest amount of attention has been directed toward these items. There are, however, several minor items such as water, supplies, enginehouse expense and "other expense". Now that the character of motive power has changed considerably on many roads, it may be worth while to examine the relation of at least one of these minor items—enginehouse expense—in its true light.

There are engine terminals on many railroads that were built from 20 to 30 or more years ago for the purpose of handling an inventory of motive power that was 100 per cent steam. On many roads the character of motive power dispatched from these terminals has changed so that in some cases the percentage of total dispatchments represented by the Diesel-electric is from 60 to 80 per cent, the remainder being steam. Strangely enough, while this transition from steam to Diesel has been rather rapid, most of the terminals out of which both steam and Diesel power are being dispatched today have changed little as far as the character of their facilities is concerned.

Many railroad men responsible for operation and maintenance and the expense connected therewith do not seem to be fully conscious of the real significance of what has happened during the past few years. There was a time when labor represented 60 per cent of the total repair bill and 40 percent was material. Today, when the details of enginehouse operating expense are analyzed, that relationship, in some cases, is as high as 85 per cent labor and 15 per cent materials and other expense. Only the retention in service of the obsolete facilities found around most engine terminals could account for the high labor costs that appear in the monthly statements of individual roads. Had many of the obsolete facilities that were "good enough" for the servicing and maintenance of steam power been replaced as rapidly as the type of motive power has changed, the story might be somewhat different. Relatively minor items, like enginehouse expense, were not worried about too much before the days of the Diesel, but now, when an item of that kind, in some cases, represents almost as much as the per-mile maintenance against Diesel-electric locomotive units, it becomes a matter of prime consideration.

The difficulty on many roads has been a policy of false economy with respect to the modernization of servicing and repair facilities. A new and intricate type of locomotive has been installed in large numbers and the same relatively crude facilities that have served the purpose for steam power just will not do for Diesel-electric power. An important consideration is that an exploration of the possibilities of achieving economies through modernization of terminal facilities and methods will not only show how to stop exorbitant charges against Diesel-electric power that is being dispatched from these terminals, but will bring out the unpleasant fact that a lot of good money has been thrown away in years gone by because managements have not seen fit to provide the steam locomotive with the kind of facilities that would have helped to keep *its* operating costs low.

Obsolete terminals and repair shops are only part of the financial leaks in the mechanical department. Almost every railroad has many other such leaks—both large and small—that are becoming increasingly burdensome with today's high labor costs and low productivity.

## Protect Air Brake Parts In Transit

It is a somewhat natural human trait for railway shop men to handle equipment parts en route to the various repair departments with less than desired care because they think, subconsciously at least, that any slight damage which may occur will be taken care of automatically in the general repair operation and entail little if any additional cost. This may be true in the case of heavy steel parts, but it certainly does apply to many of the relatively lighter and more finely finished operating parts of cars and locomotives, such as air valves, lubricators, injectors, etc., which may be seriously damaged simply by dropping them on the ground or shop floor.

A practically continuous campaign for more careful handling of air-brake and other such parts, in transit and when stored appears to be necessary in the interest of satisfactory functioning and maintenance of these

vital parts of railway cars and locomotives at minimum cost. The A.A.R. Mechanical Division considers the subject so important that it recently authorizied a survey of damage due to rough handling in loading and unloading air-brake parts, particularly AB freight equipment, and issued a circular letter on the findings. The survey, conducted under the direction of the Committee on Brakes and Brake Equipment, was made on a railroad having a large volume of air-brake parts in constant movement to and from a central air-brake shop equipped for thorough handling of all cleaning and repair work.

Approximately 1,000 parts, such as air reservoirs, brake cylinders, pipe brackets, emergency and service portions and retaining valves, which had been removed from cars for periodic attention or taken from dismantled cars, were examined carefully and 315 found damaged, many beyond repair. Among the parts particularly subject to damage were retainers, release valves, vent protectors, combined dirt collectors and branch-pipe cut-out cocks. Damage to brake cylinders and pipe brackets was for the most part confined to broken mounting lugs which could be repaired and the parts reclaimed. Rough and careless handling and failure to pack parts for shipment as specified in A.A.R. Instruction Leaflet No. 2391, Supplement 1, were apparently responsible for practically all of the damage found. A check on individual roads will doubtless disclose many packing methods now in use which differ materially from practices recommended in the leaflet and are partially or totally inadequate to give the desired protection in handling.

Another condition discovered was failure to store air-brake operating devices such as valve portions, cocks and brake cylinders, when held awaiting application, in such a place and manner that they will be completely protected from rain and dirt at all times. The necessity for reliable operation of air-brake equipment is so urgent that the exercise of exceptional care in this particular, also, is fully justified.

## An Inexpensive Way to Better Steam Locomotive Servicing

While back shops and their machinery have of late been receiving attention and criticism because of their obsolescence, little or nothing has been said or done by most railroads to overcome the handicap of antiquated maintenance and servicing facilities for steam locomotives. This is unfortunately true despite the importance of the latter in economical and reliable locomotive operation, and the fact that a long step toward the modernization of servicing facilities can be taken at little cost. The need for improvement is obvious when one considers that particularly on roads with a fair amount of modern well-kept power, less than half of the locomotives turned will need other than routine inspection, lubrication and servicing; yet in the average enginehouse locomotives must await the arrival of inspectors and workmen from perhaps half-way around the house. The out-of-service time is increased and man-hours multiplied by the continual need for shifting personnel, tools and lubricating equipment. The situation is not helped by the average present inspection pit, which is normally of insufficient depth, inadequately lighted and poorly drained.

While it is easier to criticize these conditions than to improve them, improvement need be neither difficult nor costly. Why cannot certain sections of existing enginehouses—or no-longer-needed areas of back shops adjacent to engine terminals—be set aside solely for steam locomotive servicing? Here could be located several special deep, well-lighted and well-drained pits for routine servicing. Groups of the necessary lubrication hoses would be located on each side of each pit, and small tools, clean rags, waste, etc., stored adjacent to the special pits. Such an arrangement would not of course offer all the advantages of a more elaborate separate servicing shed, but it would offer opportunity to improve present conditions and it does offer the attraction of being comparatively cheap to install. Its cost should be low enough to include one or two more pits than actually needed for servicing operations exclusively, in order that locomotives found to need unexpected minor repairs after entering the special servicing section of the house, could be made ready for service without involving an additional turntable move and without tying up the servicing facilities. The system of using these special stalls could be worked out by sending into the house all locomotives known definitely, or strongly suspected, to require repairs; others would be routed to one of the inspection pits.

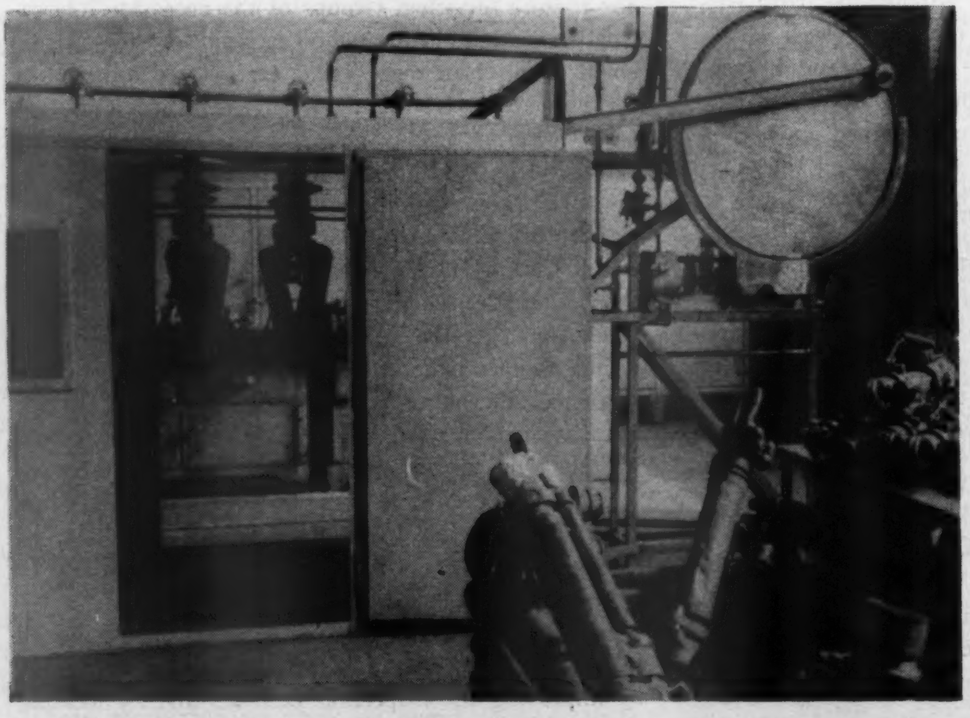
Two primary and desirable objectives in locomotive maintenance and operation can be attained at low cost by improving the inspection facilities and by locating the lubricants and small tools adjacent to the pits. The man-hours per locomotive turning will be lowered when the necessary servicing apparatus is close and convenient to the locomotive because men no longer will need to walk and carry tools and lubricants from one part of the house to another. The better inspection which will follow the improved inspecting and working conditions becomes increasingly beneficial as locomotive utilization is increased and individual runs lengthened. Defects which must be found at an early stage when locomotives are run continuously at high speeds for long distances would be more easily located. The value of the best possible inspection and servicing is evident when one considers that a small defect which can safely run one division may easily cause a locomotive failure in a 500- or 1,000-mile continuous trip. Better servicing and inspection facilities can play a definite and decidedly helpful role not only in making more and longer runs possible but as well in reducing the servicing costs at the completion of the run.

# With the Car Foreman and Inspectors

## Steam-Line Connection Tester

Vapor steam-line connections between passenger cars are checked for steam tightness under the movement they undergo in train service with a testing arrangement designed and constructed by personnel at the Union Pacific's Omaha, Neb., shops. One side of each connection in the group being tested is held stationary while the other end is moved back and forth with a crosshead motivated by a small steam engine. Up to six metallic conduits may be tested at one time. Steam at 210 lb. per sq. in. supplied by an old Vapor-Clarkson generator enters the stationary side and flows to the first metallic conduit. The path of the steam crosses through the first conduit to the moving side and supplies the connections on the moving side. It returns to the stationary side via the remaining connections under test. From here it is piped to the engine and drives it to provide the simulated train movement of the connections. Shut-off valves are incorporated in the steam lines for testing less than six train-line connections.

The crosshead is moved by a combination gear drive and connecting rod. A small gear on the crankshaft of the steam engine drives a 30-in. diameter shop-made gear to which the connecting rod is attached to furnish reciprocating motion to the crosshead. The crosshead is 8 ft. long and contains the steam connecting lines to the metallic conduits. The straight-line reciprocating motion given to the moving end of each conduit moves both ends of the connection not only through a rotary motion about the stationary side but alternately stretches and contracts it, thereby subjecting the conduit to all the motions it will undergo in train service. The connection joint of each conduit is prevented from rotating by a length of ½-in. rod to which short sections of this size rod are welded perpendicular to the center line of the main length of rod. One of these stubs fits into a hole in each connection joint and prevents the joint from turning about its own axis. The purpose of restraining the car-connection joint to straight back-and-forth motion with no turning is to



**The steam-line connection tester—To the left is the windowed enclosure—On the right is the steam engine and connecting-rod drive wheel**

**Steam-line connections in place on the testing apparatus—The moving side of the connections is in the foreground—Near the top can be seen the ½-in. rods which keep the end valves from turning during the reciprocating motion of the crosshead which drives the moving side**

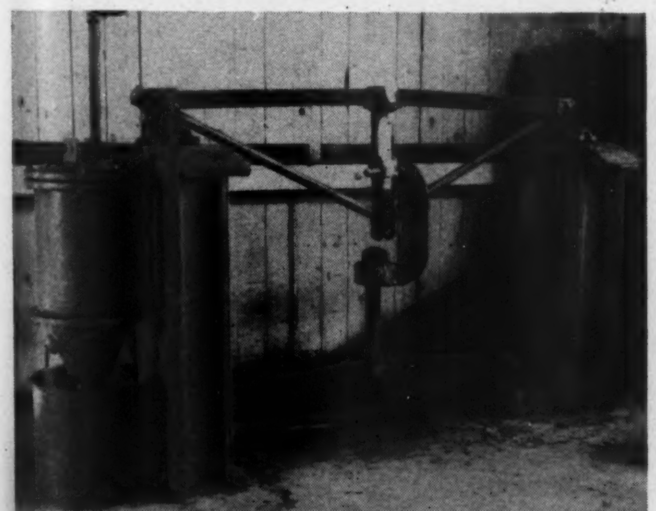
give maximum relative motion between all moving parts of the steam-line connection.

The connecting rod is made from a small I-beam and the crosshead from a scrap length of channel iron. The crosshead slides between two channels set on their sides. Welded to the bottom of the crosshead are six 5-in. squares of steel, to which, in turn, special steel bushings are welded. The steam-inlet side of these bushings has ¾-in. pipe threads and the outlet, 2-in. pipe threads. Pipe unions make the connection to the conduit end valve; different sizes are available to accommodate various sizes of metallic conduits. The entire moving part of the testing arrangement is enclosed in a metal room fitted with shatterproof-glass windows. With the setup in action and steam on the metallic conduits, any leaks can be detected and observed in complete safety through the windows.

**Brake-beam building table showing finished assembly in place—The brake-beam back is forced to the proper camber against the two angles by the action of an air cylinder mounted under the bench**

## Brake-Beam Building And Testing Layout

The brake beam back, heads, fulcrum and truss rod are put together and tested with the aid of an air-powered building table and testing rack at the Pittsburg, Kan., shops of the Kansas City Southern. The fulcrum is assembled to the back and the two parts placed upon the building table. Here the camber is put into the back by an air clamp and the back retained in this position for the application of the truss rod, brake-beam heads and nuts. The assemblage is then removed and placed upon the test rack to check the camber during and after the application of a service load simulated by the force of an air piston.



**Brake-beam tester with a beam in place for testing.**

The building table has a horizontally mounted 10-in. air cylinder located underneath the bench with a clevis on the end of the piston rod. Between the jaws of the clevis is pinned a piece of 1-in. plate 4 in. wide and 19 in. long, with the 19-in. dimension perpendicular to the rod. The plate is moved by the piston rod; it slides in two slots 1⅛ in. by 11 in. cut in two ¾-in. plates 15 in. apart and welded to the bottom of the working surface of the bench. To the outside of each plate is welded a length of angle iron ¼ in. by 1 in. by 1½ in. with the top of one side of the angle even with the bottom of the slot to give additional guide surface to the 1-in. plate. Welded to the 19-in.-long plate 12 in. apart and parallel to the movement of the piston rod are two sections of 1-in. plate 7¼ in. high. They move in 1⅛-in. slots cut in the ¾-in. horizontal plate that forms the bench top.

After the fulcrum has been centered on the back head, put in place and keyed, the back head and fulcrum are placed on the bench top against two angles ½ in. by 3½ in. by 3½ in. and 23 in. long. They are set 5 in. apart. The angles are welded to the bench top and are out of line with each other sufficiently to form the camber in the back when it is forced against them by the air piston which contacts the head through the two vertical plates 1 in. by 7¼ in. Between the 5-in. opening separating the two angles a 5-in. square hole is cut to allow the protruding part of the fulcrum to rest below the top of the table and thus permit the fulcrum and back assembly to rest flat on the table.

The horizontally mounted air cylinder is held by six bolts to the bottom of a plate ½ in. by 16 in. by 21 in. which is supported on one end by two vertical angles ⅜ in. by 3 in. by 3 in., joined together at the bottom by a third angle of this size that bolts to the floor. A ⅝-in. plate is welded along each side of the cylinder-supporting plate; all three plates are welded to the top and back of the bench. Each end of the bench is supported by two vertical and one bottom angles of the same size and in the same manner as the end of the cylinder-support plate.

The rack for testing the finished brake-beam assembly is supported on each end by two 3-ft. lengths of 100-lb. rail. Across the top of each set of two rails a curved 1½-in. plate, about 2 ft. long, is welded. To the lower part of the arc of each plate is welded a block 1 in. by 7 in. by 12 in., against which the brake-beam heads rest by gravity. The air cylinder which supplies the testing force is bolted to two plates each 1 in. by 3¾ in. by 12 in. that is welded to one pair of the vertical support rails. The other pair of rails are joined together by a plate ¼ in. by 4 in. by 19 in. welded to the outside of both rails.

The testing force is supplied by a 10-in. air-brake cylinder with a clevis on the bottom of the piston rod which is pinned to a lever made from 1½-in. plate. The lever is 68 in. long, 3½ in. high at the ends and 6 in. near the center where the brake-beam fulcrum attaches to it. The opposite end of the lever is the fixed pivot. The lever is held at this point between two angles 1 in. by 3 in. by 8 in. with a 1-in. bolt. The angles bolt to the floor.

The brake-beam assembly is placed across the test rack with the heads resting against the blocks on the curved

plates of the two end supports. The top of a heavy C-clamp, which is made from 1-in. plate becoming round with a 5-in. diameter and 3 in. thick at the bottom, is joined to the fulcrum through the keybolt hole. A 1-in. rod 12 in. long with a 1½-in. collar fits through a 1⅛-in. hole in the top of the C-clamp and into the keybolt hole. In the bottom of the C-clamp is a vertical hole through which a bolt 1½ in. by 12 in. fits loosely. The threaded end is on top and the bolt is held in the C-clamp by a nut. A clevis is welded to the head end of the bolt. The clevis jaws fit around the lever and are joined to it with a 1¼-in. pin.

Admitting air to the top of the cylinder depresses the lever, and through the lever, puts a force on the brake beam assemblage. This force is variable. There are two

**The front of the building table showing the alignment of the two angles which form the camber outline of the brake-beam back—Immediately below the top of the table can be seen the grooved plates that form the guide for the piston-rod head which forces the back against the angles**

holes in the lever to which the fulcrum may be connected. One hole is 19½ in. from the fixed pivot and the second 23¼ in. Brake-beam assemblies with a 1⅜-in. truss rod are joined to the first hole as the leverage results in the greater force. Assemblies with a 1¼-in. truss rod are tested in the second hole.

All tests are made with a pressure of 70 lb. per sq. in. in the air cylinder. The camber is checked with a gauge while the force is applied to the brake beam and again after the force is released.

## Two-Wheel Lifter Speeds Boring-Mill Output

An unfinished car wheel is loaded on the boring mill at the same time and in the same operation that removes a finished wheel with a two-part loading arrangement in use in the wheel shop on the Texas & Pacific at Marshall, Tex. At the conclusion of the boring operation, a horizontal beam equipped with wheel-holding tongs on each end and centrally supported on an air-piston shaft raises both wheels clear of their resting place. The operator swings the beam by hand 180 deg. Lowering the beam places the unfinished wheel on the machine table and the finished wheel on a supporting table that is set over a second air cylinder. When the piston of this cylinder is at the top of its stroke the finished wheel is supported horizontally. Lowering the piston tilts the table to support the wheel at an angle of about 60 deg. and with the bottom in close proximity to the floor for rolling away by hand.

The tilting-table piston is operated entirely separately from the lifting cross-arm. By including it in the lifting arrangement the machinist does not have to have his helper continually available to avoid delay in keeping the wheels feeding to and from the boring mill. The machinist sets the finished wheel on the tilting table, and his helper can remove it and substitute an unfinished wheel any time during the boring operation without interruption to production. The machinist leaves the finished wheel on the table in its elevated position. When the helper arrives with the unfinished wheel he tilts the table, removes the completed wheel, puts the rough wheel on the table while it is tilted, and elevates it, the latter operation placing the wheel in position for the lifting beam to transfer it to the machine table.

The lifting beam is made from two 6-ft. lengths of plate ¾ in. by 4 in. On each end is a three-fingered tong arrangement for gripping the wheels. The tongs are normally in the gripping position. Both are released simultaneously by a handle in the center of the beam which controls the position of the tong fingers through a chain. The center of the beam is bolted to a shaft extension of the piston rod of a 6-in. air cylinder set into the shop floor. The extension rests on a ball bearing on the top of the rod to facilitate swinging the pair of wheels. A groove is cut into the piston rod for a

**An unfinished wheel on the tilting table prior to elevation for transfer to the machine**

portion of its length. The end of a bolt screwed into the piston-rod sleeve guide rests in this groove and serves as a stop when it comes against the end of the groove. The total lift of the piston is 7 in. It is operated by a locomotive straight air valve.

The tilting table is connected to and supported by a

**Transferring an unfinished wheel to the boring mill simultaneously with the removal of a finished wheel. In the foreground is the tilting table on which the finished wheel will be set while awaiting removal and replacement with an unfinished wheel by the machinst's helper while the wheel on the machine is being bored**

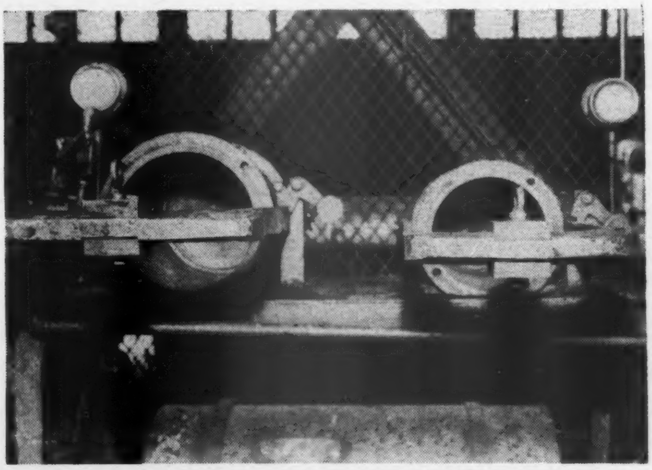
**While the wheel on the machine is being bored, the finished wheel in the foreground will be removed, a rough wheel substituted, and the tilting table raised to the horizontal position for placing the rough wheel on the machine and for receiving the finished wheel**

5-in. air piston through a hollow block 5 in. by 9½ in. by 12 in. which is open on the bottom end. Near one end of the block is a 1-in. bolt which secures two ¾-in. by 3-in. bars, 32 in. long, to the sides of the block. These bars support the wheel and each is flanged on each end to prevent the wheel from sliding off while in either the tilted or horizontal position. These bars are free at one end while the other end is pivoted to a similar pair of bars with a 1-in. bolt. The second pair of bars have a fixed pivot about a 1-in. bolt at the floor level. They are vertical when the table is raised to the horizontal position. When the piston is lowered the two sets of bars form an A-frame. In this position the wheel can be rolled on or off by hand.

# Packing Cup Tester

Both 8-in. and 10-in. packing cups for air brake cylinders are tested for air tightness with a pair of testing cylinders at the Missouri-Kansas-Texas shops in Parsons, Kan. The piston-and-packing cup assemblage is inserted into the appropriate-size test cylinder and the free end of the rod backed up with a hinged holding member. Aid is admitted to the back of the piston at 50 lb. per sq. in. The air supply is shut off and the ability of the packing cup to retain the 50-lb. pressure is noted on a gauge.

The testing cylinders are made from an 8-in. and a 10-in. air cylinder. To the back head of each cylinder is welded plate iron 1 in. by 3 in. Each length protrudes an inch or so over each cylinder outside. Hinged to each side of each back-head plate is a U-shaped backing-up piece. When the testing cylinders are idle, these pieces can be lifted clear of the front of the testing arrangement and hooked in the vertical position. When packing cups are being tested the backing-up pieces are horizontal and hold the free end of the piston rod to which the packing cup



**Apparatus for testing the air tightness of 8-in. and 10-in. air brake cylinder packing cups—In the foreground is the hinged backing-up piece which holds the piston in place against the cylinder air pressure**

is mounted against the air pressure in the test cylinder.

The hinged backing-up piece has sides ¾ in. wide by 2 in. deep which taper to 1¼ in. at the extremities where they join the end portion. The end section is 1¼ in. deep and 3 in. across. In the center of the end a block of metal is welded. To the end of the metal block a cone is welded, the maximum diameter of which is slightly less than the inside diameter of the hollow rod. The cone serves to guide the rod so that the end of the rod fits square against a ¾-in.-thick brass ring that slips over the cone. The brass ring acts as a filler piece to back up the end of the piston rod and hold it in place during the test of the packing cup.

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Prizes for Railroad Fair Photos. A week's stay in New Orleans for two persons, all expenses paid, are two of the prizes being offered by the Illinois Central for the best photographs taken at the road's Railroad Fair exhibit in Chicago. Twenty-six awards will be made for both color and black-and-white pictures, with each type being judged separately. Additional prizes in each class will be $50 for second place, $25 for third place and $10 each for fourth to 13th places, inclusive. The contest is open to both amateur and professional photographers, except employees of the I. C. and their immediate families.

# Decisions of Arbitration Cases

*(The Arbitration Committee of the A. A. R. Mechanical Division is called upon to render decisions on a large number of questions and controversies which are submitted from time to time. As these matters are of interest not only to railroad officers but also to car inspectors and others, the Railway Mechanical Engineer will print abstracts of decisions as rendered.)*

## Responsibility for Damage from Pulling Drawbar

On June 10, 1946, an all-steel hopper car belonging to the Louisville & Nashville was damaged on the Chesapeake & Ohio when a drawbar pulled out, allowing a group of cars to roll into another track and damaging the L. & N. car. No other cars were damaged, and no cars were derailed. On June 21, 1946, after receiving a Joint Inspection Certificate, the L. & N. authorized return of the car to its line loaded on a C. & O. car, provided that a defect card was attached. The car was returned but not defect-carded. The L. & N. accepted it to avoid holding the C. & O. car. As the car was damaged to the extent shown in Rule 44, the L. & N. asserted that responsibility rests with the handling line per section (10) (d) of Rule 32. Along with its statement the C. & O. attached a Joint Inspection Certificate corrected to show which defects on the car were old and which were new. The corrected certificate listed a number of items of damage classifiable as old defects, which, the C. & O. contended, indicate that the 27-year old car was in a general worn out condition. The C. & O.'s position was that Paragraph 11, Note 1, Rule 32, excepts the handling line from the responsibility for damage occurring due to train-parting accidents, regardless of whether or not the damage is to the extent of Rule 44, when the provisions of Paragraphs (a), (b), (c), (g), (o) and (q) of Rule 32 are not involved. No other cars were derailed, cornered, side-swiped or otherwise damaged under any provisions of Interchange Rule 32. The C. & O. considered the decisions rendered in Arbitration Cases 1431 and 1669 as further substantiation of its position in this matter.

In a decision rendered November 6, 1947, the Arbitration Committee considered the handling line responsible and Arbitration Case 1547 to be parallel. *Case 1827, Louisville & Nashville versus Chesapeake & Ohio.*

## When Concealed Damage is Cardable

On August 11, 1946, North American Car Corporation Class 3 insulated asphalt tank car No. 9622 was delivered to an oil company by the Texas & Pacific. Upon delivery, inspection by the car owner revealed a cracked steam-jacketed outlet nozzle damaged by fire and some visible fire damage in the vicinity of the nozzle. Three days later steam pressure was applied to the nozzle and verified the fact that it was cracked. The car owner's representative executed joint inspection to which the T. & P. inspector refused to subscribe. The car was subsequently moved to the owner's plant, and on February 27, 1947, the railway issued a defect card for all damage except the outlet nozzle.

The car owner called attention to the fact that, while the nozzle on this particular class of equipment is generally referred to as of the steam-jacketed type, it is in no sense concealed, insofar as A. A. R. Rules of Interchange are concerned. The owner disagreed with a contention of the T. & P. made May 20, 1947, quoting a recent informal A. A. R. ruling, to the effect that the nozzle was a concealed defect because the crack could only be determined by the steam test. It was presumed by the car owner that the railway had reference to A. A. R. docket AC-3487, which was not considered parallel to the case in hand since in 3487 the damaged nozzle was apparently not associated with any other cardable fire damage. The tank-car owner felt entitled to full protection, irrespective of the fact that it was necessary to steam test the nozzle to determine if it were damaged beyond the surface paint stage, since this item was directly associated with other cardable fire damage.

The T. & P. stated that the car travelled on its line July 23, 1946, and that it was delivered to the Texas & New Orleans July 24. At no time during these moves was any fire damage in evidence. The car was received empty from the T. & N. O. August 4, travelled over the T. & P., and the damage noted by the owner's inspector August 14. As substantial efforts were made to determine the manner and location where the car was damaged, without avail, the railway contended that, since the steam-nozzle damage was not visible but only evidenced by steam pressure test, under provisions of Interchange Rule 32, section (10) (K), the responsibility did not belong to the railway.

In a decision rendered November 6, 1947, the Arbitration Committee said: "The evidence indicates fire damage to bottom outlet valve nozzle was directly associated with other cardable fire damage on car, and steam test of the nozzle was necessary to determine extent of damage. The contention of car owner is sustained." *Case 1826, North American Car Corporation versus Texas & Pacific.*

## Time Limit in Obtaining Joint Evidence of Improper Repairs

On July 11, 1942, North Western Refrigerator Line Car 8764 was derailed on the Great Northern. A statement of depreciated value was furnished by the owner and the railway elected to make permanent repairs and destore the car to service, which repairs were completed August 12, 1942. On August 4, 1945, the car was received at the owner's shops where joint inspection revealed concealed and other damage and wrong repairs, which the owner contended to be the responsibility of the Great Northern.

The refrigerator line's statement noted that the railway, in the first instance, considered the car sufficiently damaged to request the depreciated value, after which it furnished two inspection statements. The first statement reported one end broken, whereas the second indicated a damaged ice bunker in addition to the broken end. The repair card indicated the application of only 35 pieces of end sheathing, which do not seem sufficient to complete these repairs. Several other items listed as damaged in the inspection report did not appear on the billing card. Consequently the refrigerator line asserted that the billing cards do not list all items of damage that were repaired, and, as no billing repair cards were found from any other company covering the application of end or side sheathing, the concealed damage and wrong repairs as found by joint inspection with a disinterested railroad are the responsibility of the G. N.

The Great Northern asserted that if the condition of the car were as indicated by the joint evidence card that it must have been involved in an accident subsequent to that occurring on its line, and that the railway had reason to believe that the damage resulting from its accident was properly and permanently repaired. This contention was based upon the joint evidence card which stated that the refrigerator line removed 76 pieces of *new* end and side sheathing to discover concealed damages and improper repairs, and that the card reported damages not

listed as having been repaired on the G. N. repair card. The railway doubted that the car would have continued in service for three years with the alleged wrong repairs and unrepaired damage without these condtions being corrected. Moreover the G. N. did not believe that the sheathing applied in August, 1942, would have the appearance of new sheathing three years later.

In a decision rendered November 6, 1947, the Arbitration Committee said: "The car was repaired by the Great Northern Railway on August 12, 1942, and joint evidence was not executed until August 4, 1945. This exceeds the two year limit specified in Paragraph (e) of Rule 12. The contention of the Great Northern is sustained." *Case 1825, North Western Refrigerator Line versus Great Northern.*

### Owner Responsibility In Center Sill Damage

On September 28, 1945, Shell Oil Company of Canada tank car No. 503 was delivered by the Canadian National to the owner with damage to the center sill at various points and with the draft casting and rivets broken. On September 23, 1946, the car was again delivered to the owner, with broken draft lugs. On both occasions a defect card was requested by Shell and refused by the C. N. The car had received a major overhaul in June, 1945; it was subsequently repaired in October, 1945, and September, 1946. The owner contended that the repairs subsequent to the major overhaul would not have been necessary had the car not received unfair usage on the C. N. The owner asserted that the damage was caused by heavy shunting on the C. N. because, when the car was received by the C. N. from the Canadian Pacific on September 20, 1946, the C. N. carded the car for a broken hand rail, and, if there was then evidence of further defects, the C. N. would have protected itself against such defects.

The C. N. contended that welding performed on the left side of the center sill was of poor workmanship, that the damage was due to the weakened condition of the center sill, and that there was no evidence of the car receiving unfair usage under Interchange Rule 32. When the car was received from the C. P. the damage other than the hand rail was not found until the car was moved to a C. N. repair track. The C. N. pointed out that the car was 32 years old when damaged, and that no repairs were made to the underframe in June, 1945. As to the defects developed on the second occasion, September, 1946, the owner strengthened the sill in September, 1945, but no new sections were applied until October, 1946.

The contention of the C. N. was sustained in a decision rendered November 6, 1947, stating: "The car was not subjected to unfair usage damage as defined in Rules 32 and 44. Therefore, damage in question is owner's responsibility." *Case 1828, Shell Oil Company of Canada, Limited, versus Canadian National.*

## Air-Operated Non-Pressure Head Assembler

The release spring in the non-pressure head of AB brake cylinders is compressed for overhauling and greasing in an air-operated dismantling and assembling device constructed at the Parsons, Kan., shops of the Missouri-Kansas-Texas. The dismantler includes a stand about 4 ft. high composed of four angles 1½ in. by 1½ in. by ¼ in. to which are welded three ¼-in. plates. The bottom two plates are solid except for a hole bored out of the center of each to accommodate a 1-ft. length of 5-in. pipe that serves as a cylinder in which a slack-adjuster piston with packing cup moves under air pressure. To the shaft of the slack-adjuster piston is fitted a head piston on which rests the piston of the head to be dis-assembled. The air is controlled by a cut-out cock located near the top of the stand.

The top plate is shaped to hold the non-pressure head by its flange and is located above the top of the assembler piston a distance equal to the height that the bottom of the non-pressure head flange is above the non-pressure

**Air-operated device for compressing the release spring in AB non-pressure heads for dismantling and assembling**

head piston. The shape of the top plate approximates a channel in which the three sides are wide enough and so located with respect to each other that the flange of the new-style non-pressure head can fit under the sides with the cone part protruding upward through the opening between the three sides. Three Z-shaped members made from ¼-in. plate are welded to the outside centers of the three sides of the top plate. The Z-shapes are about 3 in. long and each of the three webs are about 1 in. across. Old-style non-pressure-head flanges lie across the top of the top plate and fit under the tops of the three Z-members which prevent vertical movement of the head. For new-style heads one additional member is used. This is a 13-in. extension that fits on the hollow rod to guide the rod through the hollow rod packing seal. The bottom inch of the extension is about 2⅝ in. inside diameter, or of a size to fit snugly into the hollow rod. The top foot is the outside diameter of the hollow piston rod or 2⅞ in. The extension enlarges from the small to the large diameter through a right-angle shoulder which forms the support for the extension to rest on the piston rod.

# IN THE BACK SHOP AND ENGINEHOUSE

## Reclaiming Cutting Blow Pipes

Oxweld C-57-R cutting blow pipes are reclaimed at the Marshall, Tex., shops of the Texas & Pacific by swaging and reaming. The diameter of main gas-passage holes which have worn out of round from usage are first reduced by swaging and then reamed to the correct

Swaging a tip in the reclamation of a cutting blow pipe

size and contour. Prior to swaging, the parts are annealed to make soft enough to work and dipped in acid to clean off the carbon.

The swager rests on a wooden block 12 in. by 12 in. and about 3 ft. high. A length of ¼-in. plate, 12 in. wide bent to a channel shape with 15-in. legs, is bolted to the block with two ⅞-in. by 14-in. bolts. A U-shaped member welded to the channel forms the main hammer support. This member is made of plate ½ in. by 2 in. The hammer is held to it by a short length of plate ¼ in. by 2½ in. which fits around the hammer and is welded to the hammer support. A piece of hose is wrapped around the handle of the hammer to absorb shock.

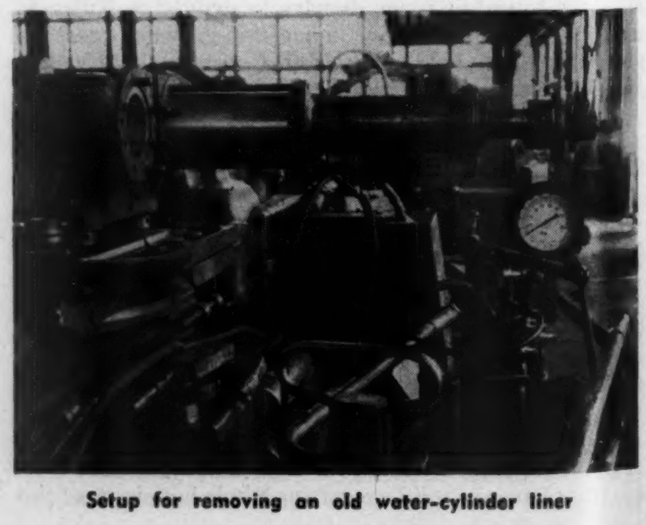
The flush snap, or head of the air hammer, sets on a block 4 in. by 1 in. by 7½ in. which has five semi-circular holes of different sizes. These five holes are the size and shape of the outside diameters of the various-size nozzles swaged on this machine. A second block, identical in size and construction to the first block, is welded to a ⅜-in. filler plate which, in turn, is welded to the channel plate. The two blocks are held together by ¼-in. bolts with the semi-circular sets of holes mating. A spring fitting over each bolt holds the blocks a sufficient distance apart for insertion of the blowpipes and for the desired swaging stroke.

All parts are swaged cold. After the internal hole has been brought down to less than the required finished size, it is drilled and reamed. The reaming is done with a drill one number size smaller than that used for the drilling, e.g., if drilled with a number 18 drill, the reaming will be done with a size 17 drill. The ends are filed flat, and the hole top radius formed and burrs removed from it by emery cloth.

## Overhauling Water Pumps To Eliminate Corrosion

Elesco type CF-1 5½-in. water pumps, when badly corroded, are fitted with brass inserts during overhaul to eliminate future corrosion of the cast-iron water cylinders and valve chambers at the Marshall, Tex., shops of the Texas & Pacific. The bushing for the water cylinder, also known as the cup bushing, fits between the bottom end of a pressed-in brass cylinder sleeve and the center piece of the pump; it has ports that mate with the integral water ports. An adapter is used in conjunction with this bushing to permit retention of the original stuffing-box design. The valve-chamber bushing is in one piece and is pressed into place.

Each water cylinder of pumps being repaired which is badly corroded is bored out to accommodate the cup bushing. The bore is made equal to the outside diameter of the cylinder liner throughout the entire length. It is carried to a flat surface ending at the center-piece end to remove the bowl-shaped top originally cast into the water cylinder so that the cup bushing will have a flat surface to be pressed against. The stuffing-box hole is bored out to receive the stuffing-box mounting, or adapter, which is threaded internally to receive the stuffing-box threads, and externally in two step sizes.



Setup for removing an old water-cylinder liner

**On the left is the valve-chamber bushing and on the right is the assembly for rebushing the water cylinders—From left to right the parts of the latter assembly are the stuffing box, the stuffing-box mounting, the cup bushing and the brass liner—The parts are shown aligned the way they fit in the cylinder**

The smaller external threads slip through the threaded opening and the larger threads screw the stuffing-box mounting in place. The mounting is screwed in until the collar between the two thread sizes is almost flush with the inside of the center piece, and the packing cup is screwed into place on the internal threads of the mounting. The collar is not brought flush with the inside of the center piece in order to allow some draw for tightening the cup bushing. The cup bushing, which has been made 1/64 in. smaller in diameter than the inside of the cast-iron cylinder, is slipped through the cylinder and screwed on the small threads. The back of the cup touches the cast-iron cylinder top before it hits the collar on the stuffing-box mounting. This provides a water-tight connection at the top. The bushing is applied with a wrench that fits in four dowel holes bored in the inside of the top of the cup bushing.

Prior to the application of the brass cylinder liner the shoulder between the two outside-diameter sizes of the brass liner is turned back about 1/16 in. to assure that the top end of the liner will meet the bottom of the cup bushing. In this way the brass cylinder-liner surface is continued throughout the inside of the cylinder by the water-tight joint that connects the liner with the cup bushings. Water cannot, therefore, penetrate into and corrode the cast iron of the cylinder at any point.

The old cylinder is removed with a hydraulic press. A cylinder with an inside diameter ¼ in. larger than the outside diameter of the liner is set flush against the bottom of the cylinders. A ¾-in. plate fits against the inner extremity of the liner and transmits the force of the press to remove the liner. The plate is generally rectangular in shape, but the small-dimension ends are machined to a radius equal to that of the cylinder casting. The plate also has a shoulder on each end, the edges of which are machined to a radius equal to the inside diameter of the liner. The fit of the plate is therefore snug against both the cylinder and the liner which guides the plate during the removal of the liner and transmits the force of the press evenly.

Prevention of corrosion in the valve-chamber bushing is attained by boring out the chamber to receive a one-piece brass bushing which eliminates contact between the water and the cast iron. The outside straight valve seat is bored out to the edge of the seat diameter; this diameter of bore is carried to the beginning of the tapered valve seat. The tool is then brought in 3/16 in. from the edge of this seat and the bore continued at this diameter to within ¼ in. from the small, or far, end of the taper. The brass bushing is pressed against this ¼-in. thick collar and furnishes a water-tight connection. The inside bottom of the brass is reamed for the tapered-valve fit.

The cup bushing, the stuffing-box mounting and the valve-chamber bushing used in this corrosion-preventing repair are patented by V. C. Ehrig, 700 East Rusk, Marshall, Tex.

## Flame-Hardening Feed Arrangement

An arrangement for feeding multiple-ledge and flat guides and radial buffers past a flame-hardening apparatus has been constructed in the blacksmith building of the Union Pacific shops at Omaha, Neb. Both guides and buffers are raised or lowered past the torches and water spray by a motor-driven gear train at a speed of from 1 to 7½ in. per min. The gear train transmits the motion for the work piece through a wire cable which winds around a drum. To the end of the cable is attached a length of chain, which is used as the final connection to the item being flame hardened because of the heat. Guides are lowered in a straight-line vertical motion while buffers follow the path of an arc to maintain a constant distance between the heating head and the surface being hardened.

Both guides and buffers are preheated to 500 deg. F. and hardened to a depth of 5/16 in. The guides are given a Brinell hardness of about 400 and the buffers between 450 and 550. These hardnesses are attained by using 10 lb. acetylene pressure and 80 lb. oxygen pressure on the buffers and 5 lb. of acetylene and 40 lb. of oxygen on the guides. The heating arrangement consists of three welding torches which feed No. 30 multiple heating heads

**Radial buffer in position for flame hardening**

containing 27 No. 57 tips in three rows in each of the three heads. The water spray is located ½ in. below the lowest flame tip. Before leaving the spray nozzle to impinge upon the work, the water circulates through and cools the heating heads. The heating head may be moved inwardly and outwardly from the buffer surface and transversely with two adjustments similar to hand feeds on a lathe.

While being fed vertically downward past the flame-hardening apparatus, guides are held at the bottom by two horizontal supports which slide in a guide-shaped bar and restrain the guide to vertical movement when lowered by the hoist. Two set screws on each support secure the guide in place. The guide is attached to the hoist by a pin and hook at the top.

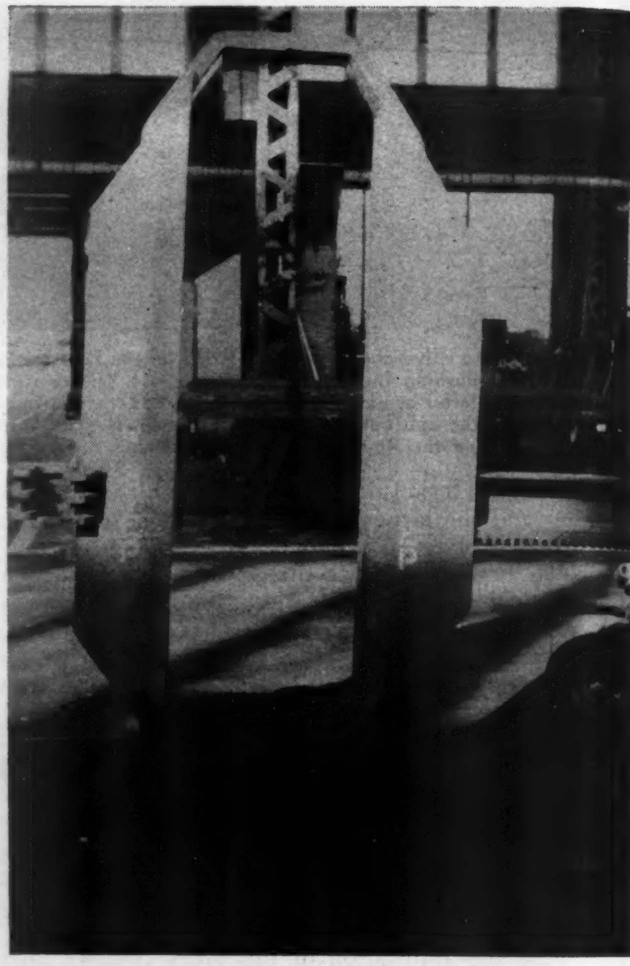
Buffers are held by a rectangular yoke which fits under a radius arm that attaches to the buffer on the free end and pivots about a fixed point on the other end. As the yoke is lowered, the end of the radius arm follows a circular path with the fixed pivot point as a center. The spherical surface of the buffer is, therefore, at a constant distance from the flame head and the water spray at all times. The distance between the heating heads and the buffer surface can be varied by an adjustment near the pivot point of each radius arm. Each adjustment is similar to the in-feed on a lathe and moves the pivot point on each arm independently of the other.

**Demonstrating the adjustments to be made to the heating for flame hardening a flat guide**

The buffer is fastened to a square plate by four bolts. On the back of this plate is a square hook, the vertical part of which points downward. The buffer-and-plate assemblage drops in place on the bottom of the square yoke.

## Passageway In Locomotive Spotter

Many man-hours are saved during the movements of a locomotive while setting the valves by a walkway built into a Whiting locomotive spotter at the Missouri-Kansas-Texas shops in Parsons, Kan. The walkway is incorporated between the end of the moving shaft and the coupler which joins to the locomotive. It enables not only the men setting the valves to pass directly from one side of the locomotive to the other without going a hundred or so feet out of their way, but the many other workers that are normally swarming over the locomotive during the finishing stages of the repair are saved a multitude of trips.



**Passageway built into locomotive spotter saves an average of several hundred trips around the far end during the course of setting the valves on the locomotive**

The walkway is of all-welded construction. It has a vertical clearance of 75 in. between the top and bottom. The side clearance is 21 in. for the top and the bottom ten in., and is 28 in. through the center portion. The walk has a non-skid surface with a minimum width of 14 in.

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HERE'S A RUN THAT GROSSES $40 A TRAIN-MILE!—Only the simplest arithmetic is required to prove that the Deadwood Central System is the country's most prosperous railroad. Less than a mile long, its one train hauls, for a fare of 10 cents apiece, in excess of 300 passengers each time it traverses the grounds at the Railroad Fair in Chicago. An average of 12,000 persons have ridden the little train daily since the fair's opening on July 20, and the increasing business has required the addition of two more coaches.

At the close of business on August 9, the fair had been visited by 956,021 persons. The 1,000,000th customer—who passed through one of the turnstiles on August 11 was presented a set of the Encyclopedia Britannica. The largest previous week-end crowd was surpassed on Sunday, August 1, when there were 75,267 paid admissions to the grounds. A record week-day total of 53,408 customers passed through the turnstiles on August 5.

The excellent reception of the show has assured its extension at least through September. If attendance continues as at present, the fair may be held through October. Some thought is being given to its possible reopening next summer.

# Air Brake Questions and Answers

## The 24 RL Brake Equipment for Diesel-Electric Locomotives—Parts of the Equipment—Locomotive A Unit

706—*Q.—Where does it go from chamber* A? A.—Through a filter into chamber *B,* and through a choke in the piston stem to chamber *C* beneath the piston, passage *30* and chamber *D* behind the regulating valve.

707—*Q.—With the system being charged, what happens?* A.—The regulating valve is unseated, so that air from chamber *D* can flow to chamber *E* passage *21* to chamber *F* and discharge passage *21* to the brake valve.

708—*Q.—What results from taking air away from chamber* C *beneath the piston?* A.—The air in chamber *B,* above the piston feeds into chamber *C* through a small choke, therefore a differential is created across the piston so that the higher pressure in chamber *B* moves the piston downward.

709—*Q.—What results from this movement?* A.—The downward piston movement, unseats supply valve *11,* compressing spring *9.*

710—*Q.—With the supply valve unseated, what happens?* A.—Main reservoir air can then flow from chamber *A* past unseated supply valve to chamber *F* and passage *21* to the brake valve and charge the system through the brake valve rotary valve and controlled release positions.

711—*Q.—What feature does this feed valve have to regulate the air pressure and flow of air from the feed valve to the brake system?* A.—The delivered air is connected back to the feed valve chamber *G* by passage *32.*

712—*Q.—What is the result when delivered air pressure in chamber* G *becomes greater than the tension of the regulating spring* 21? A.—Diaphragm *19* is moved upward, permitting spring *19* to seat the regulating valve.

713—*Q.—What results from closing the regulating valve?* A.—Air from chambers *C* and *D* is cut off from chamber *E* by the regulating valve, and is permitted to build up in chamber *C* beneath the piston through the choke in the piston stem.

714—*Q.—What is the eventual result of this build up in chamber* C? A.—Equalization of pressure in chambers *B* and *C* on both sides of the piston.

715—*Q.—What happens when this equalization point is reached?* A.—Spring *9* moves the piston upward, seating supply valve *11,* cutting off flow of main reservoir air to chamber *F* and the delivery passage.

716—*Q.—How long will the feed valve parts remain in this position?* A.—Until the delivery air in chamber *G* on diaphragm *19,* becomes less than the value of the regulating spring.

717—*Q.—What happens then?* A.—Diaphragm *19* will be moved downward, unseating the regulating valve and again connecting air from chambers *C* and *D* to chamber *E.*

# Locomotive Boiler Questions and Answers

## By George M. Davies

***(This department is for the help of those who desire assistance on locomotive boiler problems. Inquiries should bear the name and address of the writer. Anonymous communications will not be considered. The identity of the writer, however, will not be disclosed unless special permission is given to do so. Our readers in the boiler shop are invited to submit their problems for solution.)***

### Cleaning Flues

Q.—It is our practice to clean flues with air, inserting the cleaning pipe at the firebox end. How far should the cleaning pipe be inserted into the flue in order to clean them thoroughly?—R.E.D.

A.—The general practice is to use a ⅜-in. diameter cleaning pipe at least one inch longer than the flues that are being cleaned and use it with air at not less than 100 lb. per sq. in pressure. The flue cleaner should be inserted the full length above and below the units in flues that are equipped with superheater units and the full length of the open flues and tubes. When a short flue cleaning pipe is used, it only blows out the flues at the firebox end and tends to plug the front end of the flues, especially on flues equipped with superheater unts.

The latest practice is to wash flues, using a flue-washing machine which combines air and water for washing out the flues. Much better results are obtained from washing the flues than from blowing them out with compressed air and it is also a quicker and easier operation as the flue cleaner does not have to contend with the soot and dust. Washing the flues removes all the soot from the flues and superheater units which is a gain in heating efficiency and also extends the time between flue cleanings.

### Cold Riveting

Q.—What are the advantages of bull riveting over hand riveting? What are the advantages of cold riveting, and what is the maximum diameter to which rivets can be driven cold? Can rivets in locomotive boilers be cold driven?—E.L.R.

A.—The advantages of bull or power riveting are greater power which enables the operator completely to fill the hole, a steady squeezing pressure which upsets the entire mass of metal in the rivet at one time as compared with the repeated light blows of the pneumatic gun, the use of lower driving temperatures which reduce the amount of scale formations and the ability to hold pressure on the rivet until it has cooled below the critical temperature range of the rivet or 1,000 deg. F.

Cold riveting is generally limited to rivet diameters of one inch and under, although cold rivets have been successfully driven up to and including 1-⅝-in. diameter. The advantages of cold riveting are the lower labor cost as no heater is required, a saving of fuel, faster assembly because rivets can be placed in holes by hand instead of with tongs and also well in advance of riveter, and a tighter fit because the hole can be reamed smaller without allowance for expansion due to heating and the lack of scales caused by heating.

Rivets in locomotive boilers are driven hot.

## Stud Holes in Welded Boiler Shell

Q.—On several of our 4-8-4 locomotives we are applying all-welded shell courses in place of the original riveted shells. These shells have been prefabricated and shipped to us ready to apply, with the exception of the various stud holes for runboard brackets, pipe supports, etc. In applying these studs in the zone of the welded longitudinal seam are there any restrictions as to how close these holes may come to the welded joint?—R.K.L.

A.—The A.S.M.E. Code for locomotive boilers makes the following stipulations as to applying unreinforced holes to welded seams: Unreinforced holes may be machine cut through welded seams that have been stress-relieved and radiographed. The joint efficiency as well as the ligament efficiency shall be considered in calculating the thickness. Such holes may be threaded, provided that in the portion of the welded joint in which the holes are cut the following additional requirements are met: (1)—The welds have been examined by the magnetic powder method on both sides and found to be satisfactory, and (2)—The weld shall contain no slag inclusion or defect longer than 0.15 $T$ (where $T$ is the thickness of the weld) but in no case greater than ⅜ in. If either item (1) or (2) is not complied with, the unreinforced holes for threaded connections may not be placed closer than ¼ in. to the edge of the fused metal.

Although these rules do not necessarily aply to locomotives under the jurisdiction of the I.C.C. they do serve as a guide for good procedure.

## Aging of Steel

Q.—What does the term "aging" mean when applied to firebox sheets?—E.V.L.

A.—Aging in steel is the change in the physical properties with the passage of time. This change manifests itself in boiler firebox steels by a raising of the yield and ultimate strength, accompanied by a corresponding loss in ductility. On locomotive boilers the aging of the firebox sheets is accelerated due to the stresses set up in the sheets each times locomotive is fire up at boiler washouts and by the repeated heatings and coolings caused by the feed water passing over the hot metal.

# *Questions and Answers on Locomotive Practice*

**By George M. Davies**

*(This column will answer the questions of our readers on any phase of locomotive construction, shop repairs, or terminal handling, except those pertaining to the boiler. Questions should bear the name and address o fthe writer, whose identity will not be disclosed without permission to do so.)*

## Determining Side Swing

Q.—How can the side swing of an engine truck for a given curve be determined?—R.I.V.

A.—The amount of side swing which a truck needs on any curve will depend upon three things: first, the radius of the curve; second, the length of the driving wheel base and third, the length of the total wheelbase. The most accurate method of determining the truck side swing necessary on a curve is to lay out the curve to some convenient scale and lay down the wheelbase of the engine on the curve. The front drivers will, of course, crowd against the outer rail so that whatever side play there may be between the rail and flange will allow the wheels to move out beyond their normal position. The back drivers will tend to run toward the inside rail as much as the intermediate wheels will allow. Keeping in mind the amount of spread between rails allowed on the curve we may locate each pair of drivers, obtaining the center line of the engine. Then, by locating the truck wheels we may find the distance which the truck center must move laterally to accommodate the curve.

## Normalizing Rod Forgings

Q.—What is the proper procedure for normalizing carbon-vanadium forgings, such as side rods, etc. Does the procedure vary from that of plain carbon steel forgings?—E.R.M.

A.—The procedure for normalizing plain carbon-steel and carbon-vanadium steel forgings, such as side rods, etc. is generally the same. The general practice is as follows: Carbon vanadium steel and chrome vanadium steel forgings must be normalized or air annealed after forging and straightening are completed. In charging the forgings into the furnace for normalizing all long rods should be placed on edge and supported every three feet on iron blocks to prevent warping or sagging. Forgings must not be piled one upon another and they should be separated sufficiently (at least three inches) to permit free circulation of heat to all parts of the forgings.

The forgings should be reheated slowly and uniformly in a furnace to a temperature at which the scale will just form on the forgings. This temperature is 1,500 deg. F. to 1,600 deg. F., which corresponds to a light or bright cherry color in the diffused daylight of the ordinary forge shop. The flame in the furnace must not be permitted to play directly on the forgings.

After the forgings have been brought uniformly up to heat, they should be held at the temperature for at least one hour per inch of diameter or thickness. then removed from the furnace, separated at least six inches and allowed to cool freely in the air, protected from rain or snow. Under no circumstances must the forgings be quenched in water or any other cooling medium. Where a car-bottom furnace is used the bottom with the forgings will be withdrawn from the furnace and allowed to cool together in the air.

## Fastening Pipes to Cab Deck

Q.—On many of our steam locomotives we have various steam pipes, such as a stoker steam pipe and a booster steam pipe fastened to the cab deck with suitable cast-steel clamps. Could this condition be interpreted as being a violation of Rule 116 (c)?—R.E.S.

A.—Rule 116 (c) of the Laws, Rules and Instructions for Inspection and Testing of Steam Locomotives and Tenders and their Appurtenances is as follows: "Steam pipes shall not be fastened to the cab. On new construction or when renewals are made of iron or steel pipe subject to boiler pressure in cab, it shall be what is commercially known as double-strength pipe, with extra heavy valves and fittings." The securing of the stoker and booster steam pipes to the underside of the cab deck plate would not be considered as a violation of this rule because the deck is generally considered to be an extension of the runboard and not part of the cab. The cab is considered as the housing resting on the deck plate. I would not consider this rule as applying to steam pipes outside of the cab that are securely fastened to the underside of the cab deck plate.

# *Diesel Locomotive Questions and Answers*

## By J. R. Benedict

### STEAM GENERATOR CFK-4225 TYPE

*Q.—What action should be taken if high temperature switch operates?*

A.—To reset high temperature switch, open fuel bypass valve and turn operating switch off. Blow steam separator down far enough so that all pressure switch fingers close, and refill coils. Restart steam generator, and observe water pressure which should not be over 100 lb. above the steam pressure. If it is high, build up steam pressure to 200 lb., open up coil blow-down valve, and blow coils out backwards. After this is done, refill steam generator with water, and restart.

*Q.—What action should be taken if there is insufficient water at water-pump test valve?*

A.—Check for suction leak at both drain valves, water-treater tank cap, and all unions and nipples located in suction line from water pump to water storage tank, and for plugged pipes or strainers. If suction screens are clean and no leaks are found, remove check valve; put air hose in pipe to storage tank, and blow storage tank screens clean. Check if water pressure gauge is fluctuating violently indicating water pump is air bound. If water supply is adequate and water pressure is high, blow coils backwards through coil blow down valve. If this fails, at next stop close train-line valve and build train-line pressure to 200 lb. by other steam generator. Quickly open defective steam-generator train-line valve and coil blow-down valve in order to back blow coils completely.

*Q.—What action should be taken if fire does not burn?*

A.—If fire does not burn, check ignition, air, and fuel. If ignition fails, check thermal switch for tripping, motor generator set for bad brushes, dirty commutator, broken wires, or seized bearings. Check electrodes for gap of 3/16-in., and for carbon or broken porcelain. Check transformer for loose or broken wires. If unable to obtain a spark, use fuse or burning paper to start fire. If this procedure is used, the output of the other steam generator must be reduced so that defective generator fire will not stop. If air fails, check the shut-off valve, reducing valve, and air strainers. If fuel fails, check manifold and nozzle pressure gauges. Check for suction leak from fuel pump to storage tank; and check pump coupling, manifold filter, Purolator filter, solenoid filter, fuel bypass valve, 80-lb. relief valve, and key metering valve which should be open approximately one full term. Adjustment of key metering valve should not be changed on line of road except as a last resort to prevent failure. Check fuel control-valve fulcrum arm for movement. If it does not move, fuel control diaphragm is probably broken; and fuel-control fulcrum arm should be blocked down with wood. Improper operation of fuel solenoid valve could be caused bp poor contact at the No. 1 heavy-duty relay, the No. 1 heavy-duty relay shunt wire loose or broken, poor contact at low-air pressure switch, shorted or bad wire to fuel solenoid valve, dirty fuel strainer at fuel solenoid valve, or a bent needle valve in the fuel solenoid valve in which case it will be necessary to reverse fuel oil lines to and from the fuel solenoid valve.

*Q.—What action should be taken if motor will not operate?*

A.—Check pressure switch contacts, operating switch, motor overload contact, and 30-amp. fuse, coil blow down interlocks normally closed, out-fire relay interlocks normally open, high temperature and high stack switch interlocks normally closed, wires on pressure switch, 80-amp. thermal element, brushes and commutator of motor, all heavy duty relays, resistors, and low-stack switch interlocks normally open.

*Q.—What action should be taken if low- or high-stack switch operates?*

A.—If low-stack switch operates, check fuel, water, and air pressure. If these are normal, and switch still operates, remove switch; and clean contacts and spring. If high-stack switch operates, blow steam generator down; and refill. This will cool the exhaust stack, because it will operate generator blowers. With steam pressure at 200 lb. operate the soot blowers thoroughly. If not equipped with soot blowers, break up and place several soot-blower sticks in fire pot, restart steam generator and, if necessary, add another stick later on.

*Q.—What action should be taken if alarm bell rings when swtch is turned to start position?*

A.—Check coil blow-down contacts, high-stack switch, high-temperature switch, out-fire relay, motor overload switch contacts, and 30-amp. fuse.

*Q.—What action should be taken if the boiler water pump leaks during operation?*

A.—When piston plunger packing is leaking there should be no adjustment enroute unless absolutely necessary because any binding of the chevron packing on the plunger will result in failure of parts inside the pump. No attempt should be made to stop a small amount of leakage at this point as a small amount of leakage is desireable. Valve springs must not be distorted or sprung. The temperature of the water supply should be kept as low as possible to prevent freezing because hot water affects the piston packing and on Type DP-4's it destroys the vacuum in the suction line from the water tank underneath the locomotive. Also on DP-4's during freezing weather, the steam heating valves into the suction lines may be opened only when not operating the boiler and closed when operating it. During freezing weather when the supply tanks are being filled enroute the steam-heat valves to the water tanks should be opened to prevent the formation of ice but these valves should be closed when the water becomes slightly warm, which can be determined by feeling the boiler water treater tank in the engine room.

*Q.—What action should be taken during cold weather if the boiler-return line freezes and water backs up in the separator?*

A.—The surplus water can be kept low by blowing down the separator through the water glass or gauge cock drains, the separator drain, or the drain cock at the return-water bucket trap. If water must be conserved, it can be returned to the water tank by disconnecting the return line and connecting the spare hose from the separator to the water tank. During cold weather when blowing the separator down, the valve should be kept open long enough to blow all of the water out of the separator and the drain pipe permitting dry steam, which will not freeze, to pass through.

*Q.—What action should be taken during cold weather in case a locomotive is delayed behind a wreck?*

A.—If possible, water should be obtained from emergency water station; or arrangements should be made with dispatcher to have a fire truck from the nearest town supply water to the locomotive. Only one boiler should be operated at a time supplying as little steam to the train as possible. One Diesel engine should also be operated to keep main reservoir and batteries charged, alternating between units to balance fuel and water consumption.

# ELECTRICAL SECTION

**Loading Resistor for**

# Testing Diesel Power Plants

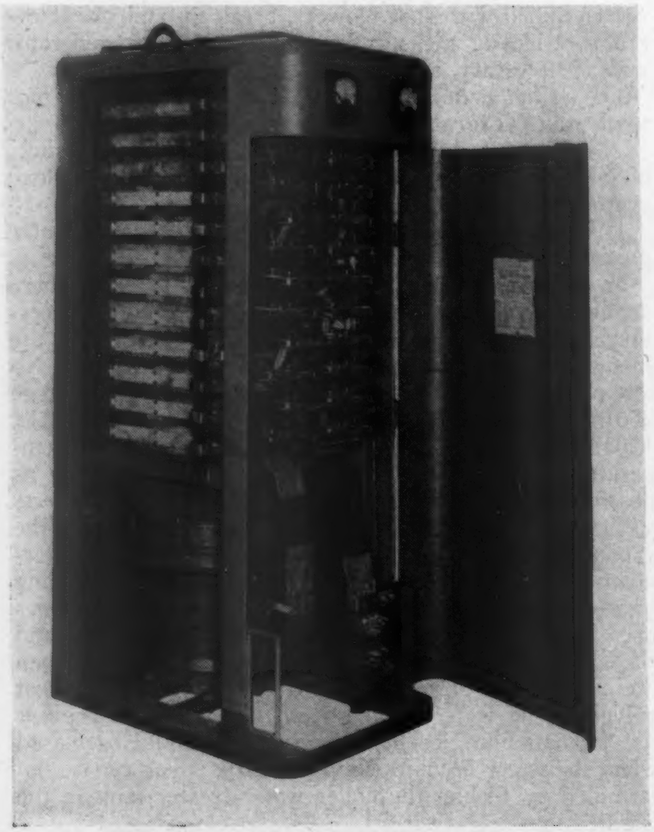

Fig. 1—Forced ventilated resistor (side cover removed) designed for loading Diesel-electric locomotive power plants up to 2,000 hp.

**By E. F. Weiser***

**Portable unit with variable loading resistance, checks engine output and generator and control performance and provides for run-in tests**

THE increasing number of Diesel-electric locomotives appearing on American railroads has necessitated the development of special equipment for their adequate maintenance. An example of such equipment is pictured in Fig. 1, which shows a loading resistor specifically designed to facilitate load testing of Diesel-electric locomotive power plants in sizes up to 2,000 hp.

In maintaining any power plant, the ability to measure its output is basic to the determination and correction of its defects. The more highly-developed nature of Diesel-electric locomotives, which gives them their superior performance, makes such a performance check during routine maintenance and overhaul very desirable.

Electric power transmission lends itself admirably to power measurement. With a resistor to load the Diesel's generator and a voltmeter and ammeter to measure the electrical-power output, the engine power is readily calculated by converting the electrical-power reading to horsepower and correcting for the generator efficiency. In maintenance testing, however, such calculations are not necessary since, if the electrical output is up to standard, it is proof that the engine output is satisfactory.

It is equally important to determine generator and control characteristics. If the resistance load used is variable in sufficient steps and is connected in place of the traction motors, it provides a means of checking the generator and its control over their operating range as well as checking the engine output.

## Power Plant Characteristics

A brief review of the Diesel-electric locomotives power-plant characteristics shows how a variable resistance load aids in their determination. At low train speed, the traction motors require low voltage and high current from the generator. As the train speed increases, higher voltage is required and consequently the current must decrease to avoid overloading the engine, since its maximum power is fixed and is proportional to the product of volts and amperes. If one increases, the other must decrease to maintain the same power.

A typical power output curve for a large Diesel-electric locomotive generator is shown in Fig. 2. By selecting a loading resistance setting of 0.160 ohms, and operating the engine at the full speed and power position of the throttle handle, the volt and ampere readings at point "C" on Fig. 2 should be obtained. The other indicated ohmic values set on the resistor should give volts and ampere readings at points D, E and F. Readings falling below those expected, show the power plant to be deficient and correct engine or control adjustments can be made on the spot. For lower power settings on the engine throttle (lower engine speed and power) similar curves such as JK are obtained.

Again referring to Fig. 2, the generator power output in watts, the product of volts and amperes, will be found to be the same at points B, C, D, E, F and G. Thus, over this part of the curve, the power output is constant

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and is equal to the engine power less the power required by auxiliaries and the generator losses. At point "B," the full rated generator load current is reached and the generator control limits further increase to protect the generator. A resistor setting of 0.0525 ohms will give a current at full engine-throttle position corresponding to point "M." The correct current reading at point "M" setting indicates proper setting of the current limit control. Similarly, in the "G" to "H" portion of the curve, the generator field limiting control prevents exceeding the field current rating of the generator. By using a resistance value of 0.945 ohms, point "N" will be obtained at full engine speed and the functioning of the field current limit control can be checked.

The loading resistor is also very useful after overhauling the Diesel engine, as a run-in period under controlled conditions with increasing load is extremely advisable to prevent costly damage if defects should appear

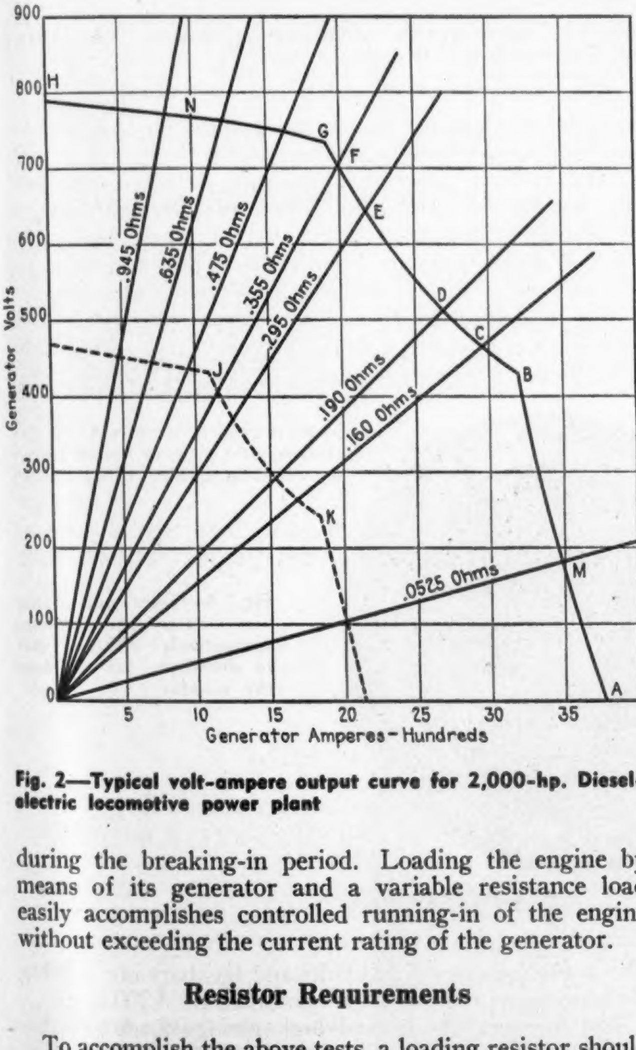


**Fig. 2—Typical volt-ampere output curve for 2,000-hp. Diesel-electric locomotive power plant**

during the breaking-in period. Loading the engine by means of its generator and a variable resistance load easily accomplishes controlled running-in of the engine without exceeding the current rating of the generator.

## Resistor Requirements

To accomplish the above tests, a loading resistor should possess the following features:

(1) Resistance variable in suitable steps to fit various sizes of traction generators.

(2) Stable resistance settings permitting operation without continued readjustment.

(3) Continuous capacity of at least 1,800 kw.

(4) Voltmeter and ammeter for measuring generator output.

(5) Means of removing generated heat from vicinity of locomotive and personnel.

(6) Portability for maximum utility and convenience in testing.

(7) Low first cost and maintenance.

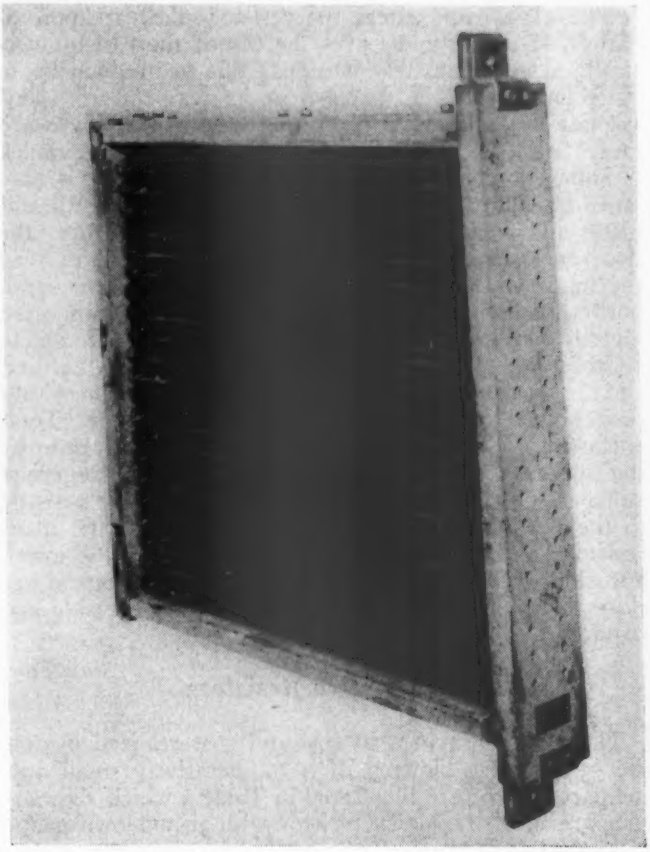

**Fig. 3—Single-resistor section showing element and insulation frame**

## Resistor Features

A forced air-cooled design, as shown in Fig. 1, was chosen as most suitably filling the above requirements. Intensive blowing of a specially designed metal strip resistor made possible considerable reduction in size over conventional resistors.

Twelve sections of resistance as illustrated in Fig. 3 are connected through suitable switches and bus-bar connections to permit arranging sections in series for higher resistance steps, or in parallel for lower resistance steps. Various other combinations of sections in parallel with sections in series result in intermediate values of resistance. Eight resistance values are obtainable as drawn in on Fig. 2, and cover sufficient range to test locomotives from small horsepower industrial switchers up to and including 2,000 hp. road locomotives.

To provide forced ventilation of the resistor, a 30 hp. vertical blower motor is mounted at the base of the resistor and is directly connected to an axial-flow fan which blows upward. The 12,000 cu. ft. per min. of air provided by the fan is distributed by a diffuser (see Fig. 4) evenly over the face of the stacked resistor sections. As shown in Fig. 3, the resistor sections are enclosed by a frame of insulation material which, when stacked with other units, forms a duct for the air and also supports the ribbons of resistance alloy in the air stream. As shown in Fig. 5, the air passes between the ribbons, which are a "Vee" cross section to provide mechanical rigidity, and on into the next resistor section, cooling each of the twelve resistor sections in succession. The connectors between the ends of the resistor strips incorporate supporting pins which can slide freely in the holes in the enclosing frame, permitting free expansion of the strips as their temperature increases.

The air stream enters the resistor stack at approximately 45 m.p.h. and leaves the top of the resistor vertically at approximately 90 m.p.h. due to the increase in its volume with the increase in its temperature. This velocity is sufficient to carry the hot-air stream upward away from the locality of the locomotive and personnel.

Sufficient resistor-ribbon area and cooling air is provided to dissipate continuously up to 2,300 hp. An ammeter and voltmeter (see Fig. 1) are mounted over the door enclosing the switches and are connected to read the input to the resistor. The blower motor can use a portion of the power being dissipated and so is connected directly across a part of one resistance section. Complete reliability of the blower power supply is thereby assured and the blower will operate at a speed and air delivery rate proportional to the power input to the resistor. Total enclosure of all live switches and other parts improves the appearance and protects personnel from dangerous voltages. The power cables for connecting the resistor to the propulsion generator are connected to the main resistor bus bars internally and emerge from the lower left side of the resistor. Since the resistor can be set close to the locomotive, only short lengths of cable are required.

## Comparative Resistors

The marked savings in size and cost realized by the use of intensive blowing of a comparatively small and compact resistor are illustrated in Table I which shows a comparison of the blown resistor with an unblown metal element resistor and the familiar water rheostat of equal continuous power ratings.

**Table I—Comparative Data on Three Types of Resistors of 2,300-Hp. Continuous Capacity**

| | Blown resistor | Unblown resistor | Water rheostat |
|---|---|---|---|
| Weight in lb. | 2,800 | 10,000 | 40,000 |
| Volume in cu. ft. | 83 | 473 | 2,000 |
| Floor space in sq. ft. | 10.5 | 285 | 200 |
| Type of installation | Portable | Fixed | Fixed |
| Relative cost installed | 1 | 3.2 | 3.5 |

The familiar "water box" or water rheostat capable of absorbing 2,000 hp. continuously becomes quite cumbersome in size as well as expensive and non-portable. The attendant foundations and plumbing for cooling water supply and drainage, and power bus work for a workable installation, tip the scales in favor of the portable air-cooled design. Replacement of rusted and corroded parts and supply of water and salt for water rheostat represent quite an item of operating cost not encountered in the air-cooled design. The most exasperating feature of the water rheostat, however, is its resistance variations with load and temperature. Controlling the load on the generator requires constant attention of an operator, whereas the metal resistor of the unit described above is completely stable and dependable and operates without attention.

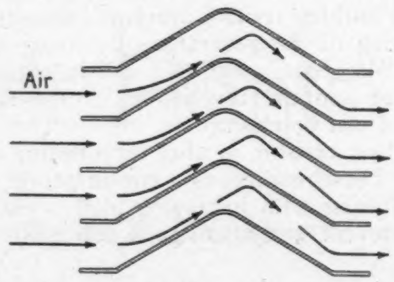


Fig. 5—Cross section of resistor elements showing "Vee" section of ribbons and path of cooling air

The resistor described, although designed primarily for testing Diesel-electric locomotive power plants, is applicable to any large direct-current power dissipation job. With a separate direct-current power source for the d.c. blower motor and proper voltmeter and ammeter, it may also be used on alternating current. The insulation is adequate for 1,200 volts and bus bars are suitable for continuous running at a maximum of 3,200 amp.

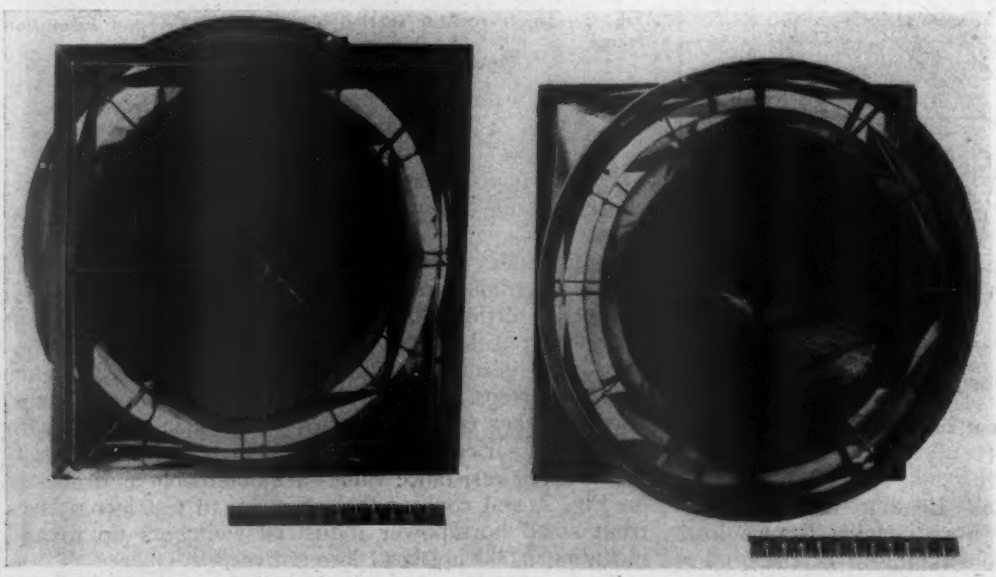

Fig. 4—Inlet and outlet view (top and bottom, respectively) of air diffuser to distribute fan air over the resistor

The compact design and high ratings made possible by intensive blowing, elimination of organic insulation and allowance for free expansion of the resistor elements have opened up many new fields of application. The design enjoys advantages in cost, size and weight over conventional resistors.

Variations of the above design have been applied for dynamic braking on Diesel-electric locomotives and as braking and accelerating resistors on electric locomotives. Smaller versions are also practical and competitive on a cost basis down to about 100 kw. in size. If physical size is of primary consideration, blown units are feasible in ratings of several kilowatts, the limiting factor being the cost and size of available motors for operating the blowers.

# Worn Traction Motor Housings

By Donald M. Laflin*

**Procedures for machining the wear points on motor housings to their original dimensions after worn surfaces have been restored by means of welding**

The phenomenal increase in the number of Diesel locomotives, both for road and switching service incurs unusual maintenance and repair problems. This is largely the result of severe conditions under which such equipment operates. Exposure of certain locomotive parts to heat, cold, snow, rain, dirt, dust, ice and water hastens part wear and breakdown. A good example is that of traction motors which must operate efficiently at all times regardless of weather and climatic conditions.

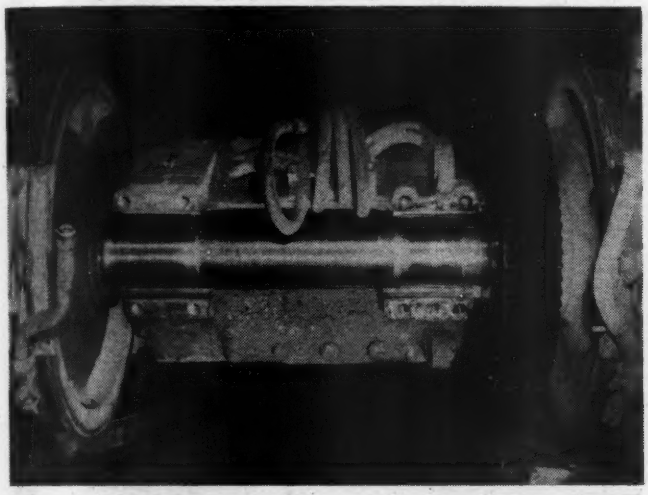

Fig. 1—Bearing caps have been removed from the traction motor—The motor housing immediately behind bronze bearings must be built up by welding and then machined

Little imagination is required to realize the tremendous power loads carried by such units and the necessity for outstanding truck design to support and carry the motors. It should be recognized, even under the best operating condition, traction motors are subject to extraordinary shock and strain. Regardless of the type of motor mounting used, whether it be axle-hung with nose suspended common for d.c. type units, geared quill above the axle-type mounting, or motor and quill mounted on the frame for a.c. type units, there are definite wear points. Characteristically, these points occur:

(a) Immediately behind the axle bearing and on the axle cap spline.

(b) On the housing face.

(c) On the gear-case supports and motor nose piece.

Continuous wear through external conditions eventually causes axle misalignment, improper meshing of reduction gears, noise and, in aggravated instances, complete breakdown of the truck assembly.

While replacement of complete traction motors may have been practical at one time, this condition does

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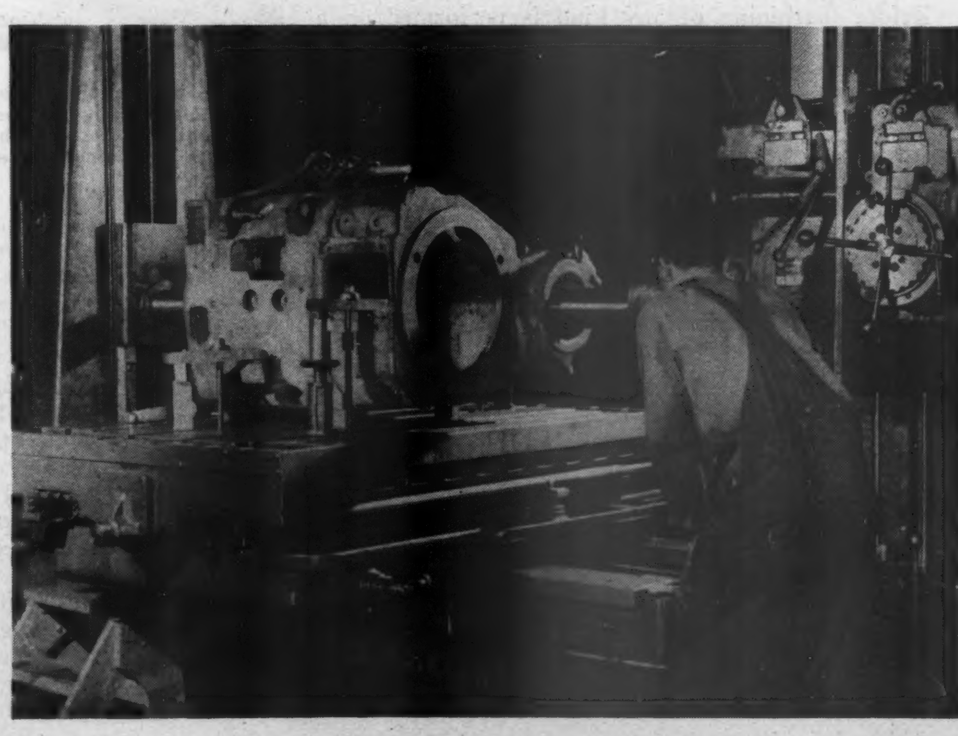
Fig. 2—The traction motor housing is bolted directly to the horizontal boring-machine table



not prevail now, largely because of the number of motors involved and the uncertainty of obtaining new units in a reasonable length of time.

## Factors Involved in Traction Motor Reconditioning

Once traction motors are brought in for repairs a definite maintenance pattern is followed. Insofar as

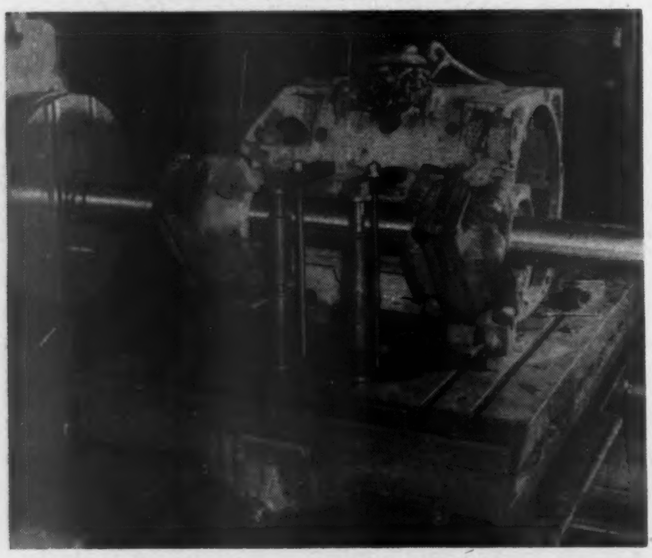


Fig. 3—Motor housing in the process of being rebored—Two cutters are used to speed this operation—Full support of the boring bar between the machine headstock and the support column insures accurate alignment

rebuilding and reconditioning the electrical elements, such as rotors, stators, field wiring, etc., this is a subject within itself and will not be treated in this discussion. Attention should then be focused upon the traction-motor housing and the methods used to rebuild it.

Reference to Fig. 1 shows a typical d.c. type axle-hung traction motor with bearing caps removed. The motor will be taken from the truck assembly for reconditioning, electrical components will be removed and the housing will be cleaned for inspection.

Before machining of any kind is performed on a motor housing, it is carefully checked and wherever wear occurs, such spots, or even housing sections, are filled by welding. This method of replacing metal provides the extra stock used to machine the casting to its original dimensions.

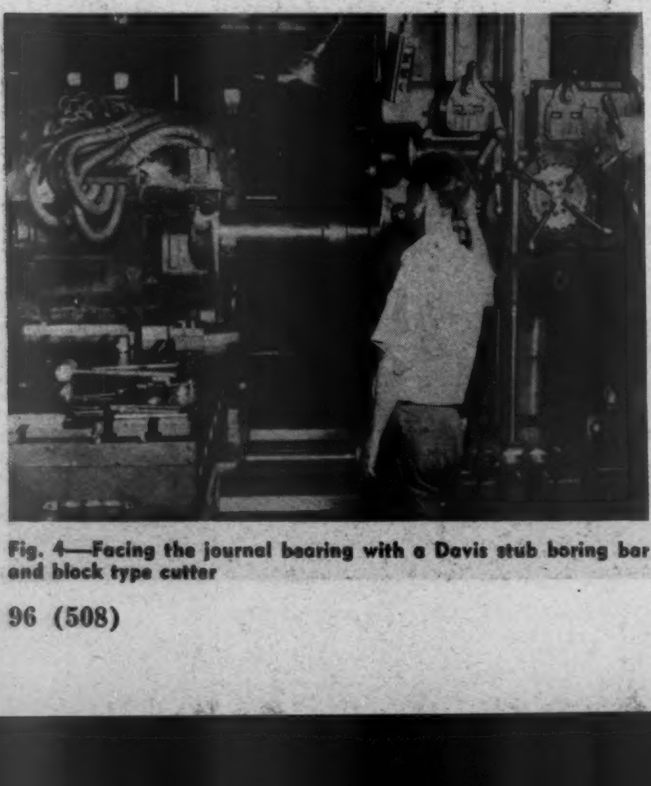


Fig. 4—Facing the journal bearing with a Davis stub boring bar and block type cutter

In this particular unit for a gas-electric motor car, greatest wear occurred immediately behind the journal bearings.

The reason was largely the tremendous vibrations caused by severe service. As space increased between the journal bearing and housing, the drive-wheel gear shown and its armature pinion could not mesh properly. This eventually caused trouble in the overall truck operation and it was necessary to remove the motor for repairs.

In Fig. 2, a traction-motor housing is bolted directly to the table of a horizontal boring, drilling and milling machine. By extending a line bar through the two bearing holes, with bearing caps in place, see Fig. 3, it is possible to bore both holes simultaneously. The procedure in this case provides for bolting centering plates on the housing. These duplicate the end shields. Four bolt holes in one end of the motor frame indicate where the plate fits. A centering shaft is placed between the plates to simulate the armature shaft. With

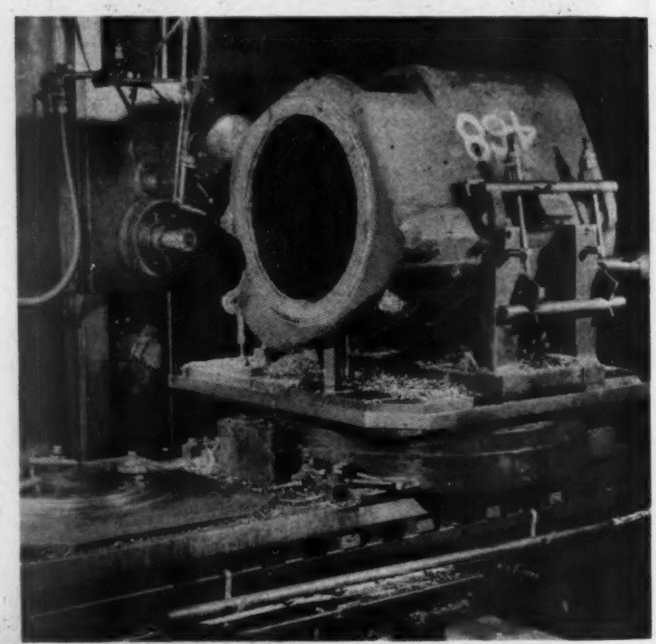


Fig. 5—Special work-holding fixture mounted on a standard rotary table—Amply constructed, this fixture rigidly supports the motor housing—The motor housing is placed on a rotating plate to simplify machining supports and nose piece

this bar or rod in place, it is quite simple to establish the center distance between the motor and the bearing bores. Table movement and machine scales and verniers are used to accurately establish this distance.

Boring operations follow. Parallelism of bores is maintained to required specifications. In Fig. 4, the machine operator is using a Davis block type cutter to face the bearing cap and cheek. A longer bar will be used to back-face the opposite bearing, making it unnecessary to change the work setup. Bearings are then fitted into the bores and once again the housing is returned to its original condition.

This machining procedure is followed in the shops of two large railroads where unit production is not extraordinarily high. However, in those shops where numerous motor housings await machining and where a series of operations must be made to return the casting to its original condition, a different method of handling is followed.

## Increased Production By Work Holding Fixture

Mounting the motor housing directly to the machine table as previously shown requires too much productive time especially when hundreds of motor frames await machining. To speed production of traction-motor housings and maintain daily work quotas, a large eastern concern engaged exclusively in this type of work has devised a special holding fixture to mount on a standard rotary table. Use of this arrangement makes it possible to perform a series of operations in a single work setting. Reference to Fig. 5 shows the workpiece, fixture and rotary table.

This fixture is made of heavy fabricated steel bars and rigidly supports the awkward casting. Adjustment of hold-down bolts, jacks and jack screws brings the work piece into correct machining position. This is vitally important because all machined surfaces must be in proper relation when the traction motor is reassembled and placed on the locomotive truck. After this initial setting is made, it is unnecessary to make further setups for milling, boring and facing the housing as indicated. Machining progresses in planned sequence.

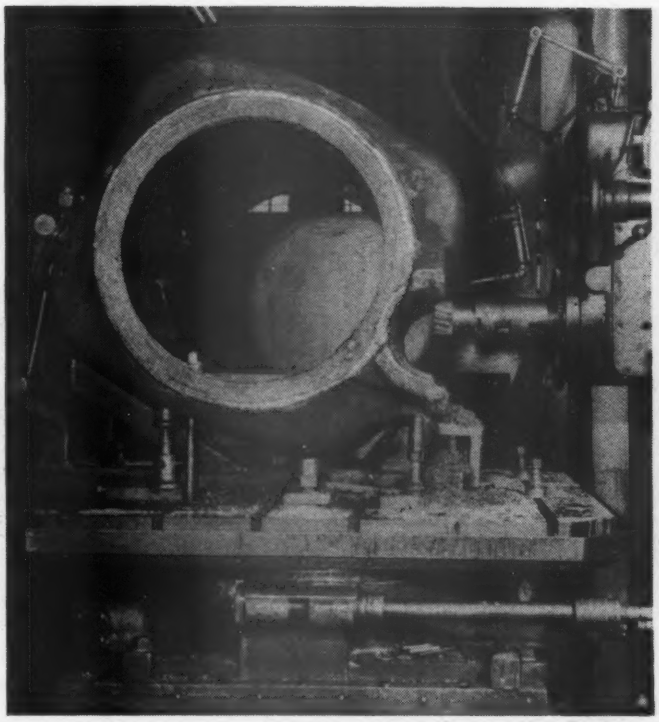


**Fig. 6—Milling the axle bearing spline—The weld build up is shown both on the face of the large armature bore and the bearing-face bore**

## Operations Performed on Traction-Motor Housing

The method of reclaiming the housing is indicated in Fig. 6 by the weld fill which clearly shows the surface wear points with the exception of the frame fit. After filling, the end of the casing must be bored and faced, also the journal bearing seat must be bored and faced. Then in a second setup which will be described later, the housing supports and nose piece are machined.

The first operation on the housing is that of milling the bearing splines to receive the axle bearing caps. It is interesting to note that dimensions are determined from the bearing cap seat immediately above the splines. The latter is being milled in Fig. 6. The bearing cap seat surface does not require machining or reconditioning for there is no wear at this point.

After both splines have been milled, see Fig. 7, the bearing caps are bolted into place and the rotary table is indexed 90 deg. A continuous feed facing head is then mounted on the horizontal boring machine headstock and the armature opening is bored and faced. The dimension on this 22.137-in. diameter is held to — .000 + .002 in. Center distance is easily established by using the machine's scales and verniers, measuring from the bearing cap seat to the armature bore center. Upon completion of this work, the axle bore is faced.

When one end of the housing is completed, the rotary table is indexed 180 deg., thus presenting the opposite surface to the cutting tool. The axle bore is faced,

(*Continued on page* 100)

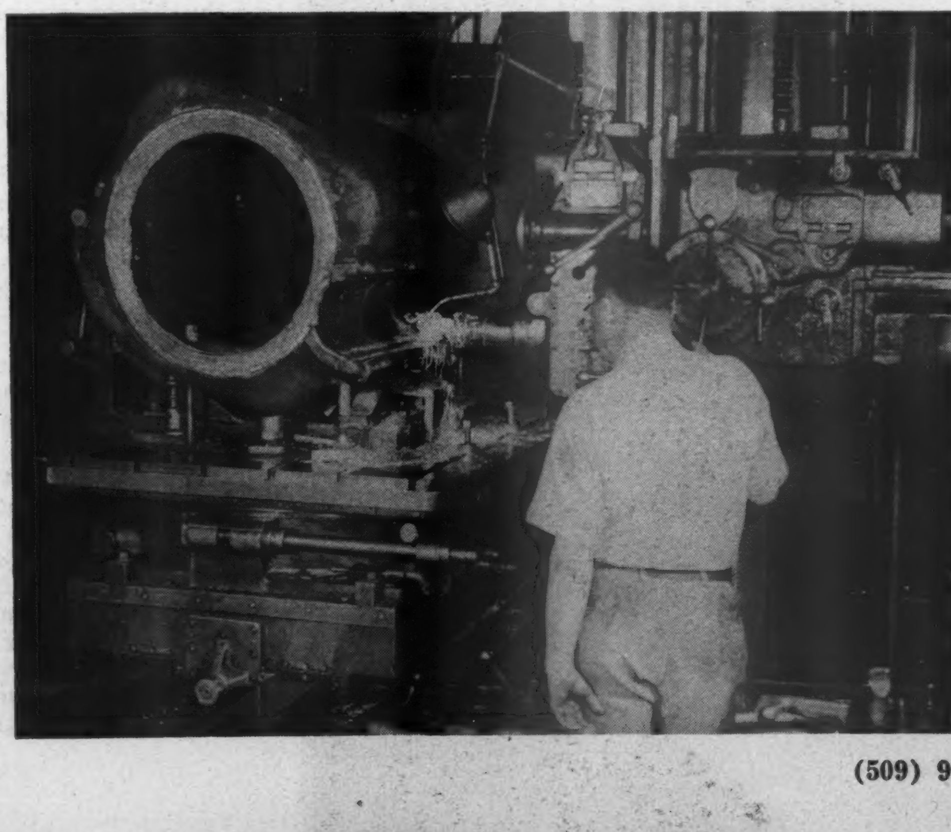


**Fig. 7—From the bearing-cap seats shown, all finish machining dimensions will be calculated**

# Trainphone Power Supply


Fig. 1—One of the trainphone-equipped cabin cars, showing the location of the battery box, the generator and charging receptacle

Fig. 2 (above)—Generator, suspension, pulleys and charging connections

Fig. 3 (below)—The regulator cabinet is accessible from the inside of the car

**Pennsylvania obtains the power required for cabin cars from a 1-kw. axle-driven generator without the need for regular charging from a wayside power source**

THE Pennsylvania Railroad is now making extensive use of the inductive type Trainphone for communication between the front and rear of freight trains, train-to-wayside and for train-to-train communication. In the process of developing this system, the railroad has also developed a simple and satisfactory means of supplying the electric power required for cabin cars. Except for emergencies and such charging as may be required at each ten-day inspection period, all of the power needed by each cabin car is supplied by a 1-kw. axle-driven generator. Communication power requirements on the locomotives are supplied by the headlight turbine-generator set.

In addition to about 450 engines equipped, Trainphones are now in service on 90 cabin cars, one of which is shown in Fig. 1, on the 130-mile Middle Division between Enola, Pa., and Altoona, and 12 cabin cars on the 50-mile Belvidere-Delaware Branch of the New York Division between Trenton, N. J., and Phillipsburg, two of the latter running through to Enola, Pa. On the Middle Division, most freight trains are preference, or through freights. Service on the Bel.-Del. Branch includes some local freight trains, but even on these trains, axle-generator charging is usually sufficient to keep the batteries on the cabin cars in good condition.

### Cabin Car Power Supply

The axle-generator shown in Fig. 2 is a 1-kw., 45-volt, body-hung machine with constant-tension suspension. It is driven from an axle by a 3-in., 4-ply balata belt. The axle pulley is 18 in. in diameter and has a 10-in. crowned face. The armature pulley is 7 in. in diameter and has an 8-in. straight face. The belt fastener is a bolted clamp type.

The generator regulator, reverse current relay, and voltage regulator, shown in Fig. 3, are in a cabinet in a

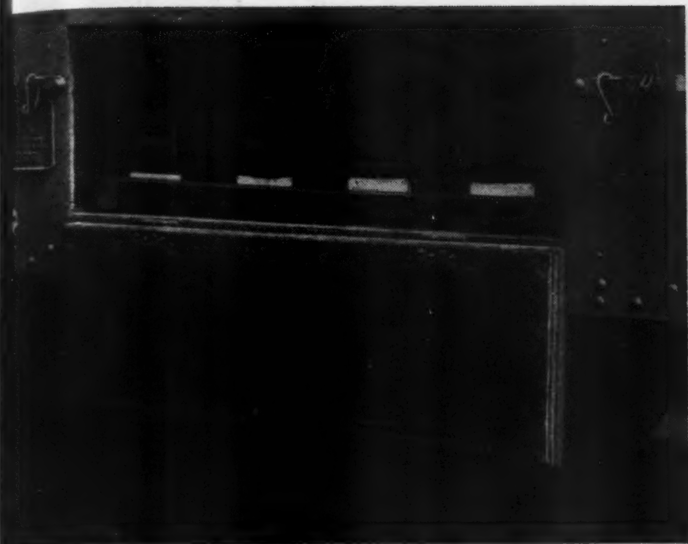


Fig. 4—The battery box with the door open for inspection

Fig. 5—Charging generator, switchboard and controls—Soda solution is used for counteracting acid action

corner of the car under one of the seats, and are accessible from the inside of the car. Full generator load is obtained at 18 m.p.h.

Both nickel-iron-alkaline and lead-acid type batteries are used. The lead-acid batteries comprise 16-cells rated 225 amp.-hrs. at the 8-hr. rate. They are assembled in four monobloc cases, and the total weight is about 1,100 lb. per set. The maximum permissible size of each monobloc is: length $29\frac{1}{4}$ in., width $12\frac{3}{4}$ in. and height $11\frac{15}{16}$ in. The battery size was determined by battery drain and average length of time on the road for a round trip. It is sufficient to supply adequate power in the event of a belt or generator failure en route. The load on the system is about 325 watts for receiving and 585 watts for sending.

The battery box is also under the seat, adjacent to the regulator and reverse current relay cabinet, but the battery box is accessible only through a door in the side of the cabin car as shown in Fig. 4. It is sealed off from the car interior, and is ventilated to the outside. There are also vents in the bottom of the box to provide for cleaning. The interior of the box, including the blocking and flooring are coated with asphaltum paint. The batteries are securely blocked above the center line of gravity of the trays to prevent breakage or shifting under road impact.


Fig. 6 (above)—Cabin car servicing track with paved roadway for trucks when replacing batteries or generator

### Inspections and Terminal Charging

Batteries are checked for specific gravity, voltage and electrolyte level at ten-day intervals. They are also given a charge at this time if it is necessary. The standby charging facilities are also used in between the ten-day inspection periods in case of a generator or belt failure on the road.

Terminal or standby charging facilities are available at one end of the Division only. There is one at East Altoona, Pa., and one at Phillipsburg, N.J. Power is supplied at East Altoona by a motor-generator set consisting of a 220-volt, 3-phase, 60-cycle, 25-hp. motor driving a 60-volt, 300-amp. d.c. generator as shown in Fig. 5. This also shows a glass container with a soda solution for use in case battery acid is spilled on the body or clothes.

The charging jack No. 1 on the switchboard is used for charging spare batteries which are kept in a room adjacent to the generator room.

There are five 100-amp. charging receptacles, spaced

Fig. 7 (below)—Application of generator jack buggy and belt slackener—the latter is used when replacing belts

at intervals along the servicing track at East Altoona, two of which are shown in Fig. 6, and four receptacles at the Phillipsburg installation. Jumper cables with plug terminals are used for making connections between the wayside receptacles and the cars. A standard battery charging receptacle is mounted on each side of the car to the battery box.

The jack buggy used for replacing a generator and the belt slackener are shown on the ground in Fig. 6, and are shown as used in Fig. 7. These devices are easily applied and have been found useful.

Failures of power supply occurring en route are reported at destination by the freight conductor, and necessary repairs are made or servicing provided promptly. Spare sets of batteries are available for emergency replacement as required, but such battery replacements have been infrequent.

Voltage regulation and tube life on the cabin cars have proved to be better than on locomotives.

## Reconditioning Worn Traction Motor Housings

(*Continued from page* 97)

the milling cutter removed and a line boring bar placed in the machine spindle. Axle bore is then machined. This bore, like the armature opening, is determined from the bearing cap seat, which is of course the locating point for all precision machined surfaces.

The 22.137-in. armature bore is completed and faced. The motor housing is then removed from the fixture and placed vertically on a simple rotating plate which is mounted on the machine table. This plate is shown in Fig. 5. It is then an easy matter to machine the housing supports and nose piece.

### Job Facts

Machine: No. 340 table type Giddings & Lewis horizontal boring, drilling and milling machine with extended saddle

Standard machine accessories: Rotary table, continuous-feed facing head

Part: Traction-motor housing

Material: Steel casting—weld filled

Holding method: Special fixture and rotating plate

Setups required: Two

Setup time: Approximately 45 minutes

Machining time: Ten hours average

Dimensions: Parallelism — .000 in. + .002 in., diameters — .000 in. + .002 in.

Tools: High-speed steel

Coolant: Soluble oil

From the foregoing information, the reader finds different methods of machining traction motors. Undoubtedly, as the number of these motors increase, there will be advances made in re-machining the housings. It should be remembered the overall accuracy of this type work depends largely upon completing as many operations as possible in a single work setting. To move the part from one machine to another automatically increases the possible cumulative error. Machining practices on awkward-to-hold work should be determined by the flexibility of the machine tool used and this should permit multiple operations on the part with minimum work setups.

* * *


**A 66-ton Whitcomb Diesel-electric locomotive being loaded aboard the S. S. Mormacdawn, for shipment to Bahia, Brazil —The locomotive is one of a shipment of nine built for the Ministry of Transport and Public Works of the Brazilian Government by the Whitcomb Locomotive Company, of Rochelle, Ill.**

# NEW DEVICES

## Three-Wheel Swing-Boom Crane Car

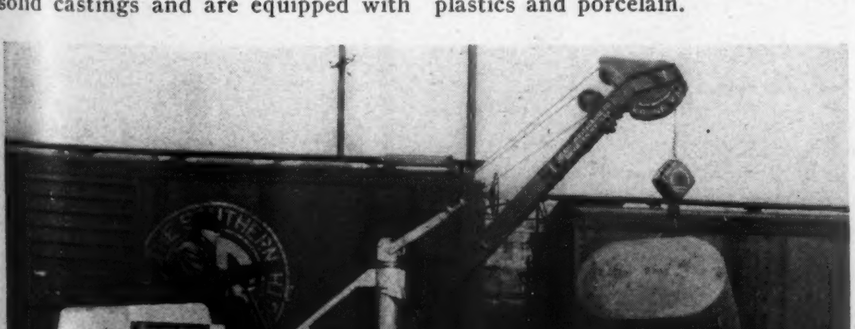
The model AJ Krane Kar is a gasoline-engine-driven mobile crane 51 in. wide, 82 in. high and with an 11-ft. turning radius that will lift, swing and transport a 3,000-lb. load at a distance 4½ ft. from the front axle. The crane has a telescopic boom adjustable from 9 to 14 ft. in length, a weight of 10,500 lb., a drawbar pull of 3,000 lb.

A 42-hp. gasoline engine furnishes power for all travel and crane operations. There are four speeds forward and reverse with a maximum in either direction of 20 m.p.h. For hoisting and power lowering, and for boom topping, there are also four geared speeds, from 18 to 115 ft. per min. up and down, while for boom swinging through 215 deg., the same number of geared speeds permit this arc to be covered in 4 to 25 seconds.

The Krane Kar has three separate power-reversing worm gear units, one each for hoisting, swinging and topping by power, which operations may be done either independently or simultaneously, and with full load on the hook. A bank of three end levers control the crane operations, one lever for each unit permitting movement in both directions and automatic breaking and holding in neutral positions. The controls are of a sensitivity that permits the operator to raise or to lower a load a small fraction of an inch at a time. Should the operator stall the motor or step on the clutch, the load would automatically stop.

For easier steering and greater traction with greater loads the crane has a front wheel drive and rear wheel steering. The three point ground contact aids in attaining ability over irregular surfaces. All wheels are one-piece solid castings and are equipped with Timken roller bearings. Either solid rubber tires or pneumatic tires are available. With solid tires the traction wheels are 36 in. by 6 in. and the steering wheel 28 in. by 7 in.; with pneumatic tires the sizes are 7.50 by 20 and 7.50 by 15.

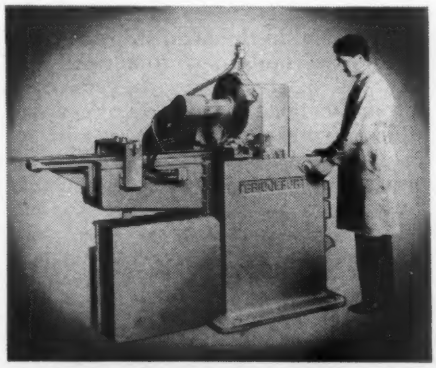
The Krane Kar is a product of the Silent Hoist & Crane Company, Inc., 841 63rd street, Brooklyn, 20, N. Y.



**The model AJ mobile swing boom crane has a capacity of 3,000 lbs. at 4½ ft. from the front axle—With a 51-in. width and an 11-ft. turning radius it can negotiate narrow and intersecting aisles in shops**

## Abrasive Cut-Off Machine

The Bridgeport Safety Emery Wheel Company, Stratford, Conn., has developed a fully automatic abrasive cut-off machine designed for high-speed cut-off of stock up to 2 in. square in lengths ranging from ¼ in. to 12 in. Known as the Model 51, the machine will handle practically all materials used in industry, including steel, brass, plastics and porcelain.



**The Bridgeport Safety Emery Wheel Company's Model 51 abrasive cut-off machine can handle nearly all materials used in industry**

The head assembly, which consists of an 18-in. abrasive cut-off wheel driven through V-belts by a 10-hp. motor, is mounted on a rocker shaft running in Timken bearings and is actuated by a hydraulic cylinder which feeds the wheel in and out of the cut. The hydraulically operated feed mechanism is synchronized with the cutting head and automatically feeds a predetermined length of stock into position where it is gripped by a holding vise. After the cut has been completed the wheel withdraws, the feeder returns to normal position, and the cycle is repeated automatically until the stock is exhausted or the machine is stopped by the operator.

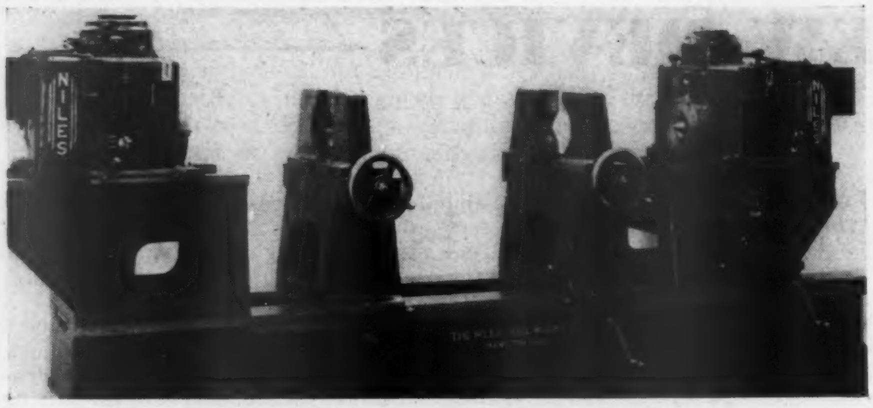
## Hydraulic Axle-Centering Machine

An automatic hydraulic axle-centering machine for renewing centers on axles, prior to turning operations, has been designed by the Lima-Hamilton Corporation, Niles Tool Works Division, Hamilton, Ohio, to handle axles with or without the wheels mounted. When mounted on centers in the machine, the concentricity of journals, wheel seats and wheel treads may be checked. The axles can be chucked on the collar or journal, and in the case of unmounted axles, they may be chucked on the wheel seats.

The machine consists of a bed, two sliding heads and two axle-chucking units. The right hand head is assembled on a stand that slides on the bed and has an adjustment for accommodating various lengths of axles. The left hand head is mounted on a fixed stand bolted rigidly to the bed.

The centering heads have anti-friction bearings throughout. The spindles are fitted with a Morse taper socket for the centering cutters, and plain centers for checking concentricity. Each head is fitted and gibbed to the stands and is driven through worm gearing by a 3-hp., vertically-mounted motor. The feed and traverse are automatic. The heads are automatically lubricated from a reservoir and pump in each head. The spindle heads have clamps to hold them in position while checking the concentricity of axle journals and wheel treads.

The chucking units, mounted between the centering heads, and the jaws are fitted and gibbed to the bed and stands respectively. By means of a left hand-right hand screw in each unit an axle is aligned with the spindle centers. The axles can be clamped on either the journals or the collars. The units are adjustable, with respect to length and diameter, to accommodate various size axles, both mounted and unmounted,



The Lima-Hamilton automatic hydraulic axle-centering machine.

with either inside or outside journals.

The machine has full automatic operation, the cycle beginning when the operator places the manually-operated lever in the traverse position. The head then moves forward automatically, at the traverse speed, until a pre-set cam shifts it into feed. The head continues in feed, boring out the center, until the end of the axle comes in contact with a plunger on the face of the head. The plunger energizes a timing relay, and after a suitable time delay, during which the head is dwelling against a positive stop, the machine is automatically reversed and traverses back to its starting position and stops, prior to a new and complete automatic cycle. This procedure insures that all centers are bored to the same depth.

## Boring, Drilling and Milling Machine

The Lucas table-type horizontal boring, drilling and milling machine features finger-tip electric control with all movements of the spindle, head, table and saddle controlled from a pendant control which can be swung, raised or lowered within the operator's reach as required. This control station is so arranged that when the operator has become familiar with the relative location of the various push buttons and selector switches, he can control any movement or adjustment by touch without diverting his attention from the work.

Full directional control of the vertical, cross and longitudinal motions by a patented arrangement of buttons and switches on the front and side of the pendant show the direction of the motion controlled. Indicating lights are incorporated to show the units selected. By this multi-position remote control it is possible to jog, start, stop or reverse the spindle rotation quickly and to make slight movements or to feed or rapid traverse in either direction continuously. Table, head and saddle feeds can be operated in combination for contouring through push button manipulation. Automatic limit switch stops on all motions in both directions prevent overtravel. Engaging the electrical control for motion in the opposite direction serves to back any unit off its limit trip.

A large graduated dial on the front of the head shows the position of the spindle. An adjustable dial adjacent to it can be set to trip the spindle feed electrically at any desired distance within its entire range of travel, serving as a full-length capacity depth gage. Limit switches located in the traverse dial in the head stop the spindle power motion automatically at each end of its nominal traverse. An automatic cycle for alternate feed and rapid traverse to the table may be set up by adjustable trips for milling interrupted surfaces. After feeding across the first of such a series of surfaces, the rapid traverse automatically engages to jump the space to the next cut and then automatically drops back to the feeding rate and so on for any desired number of repetitions of the cycle within the range of crossfeed, finally tripping out at the end of the cuts or limit of table travel.

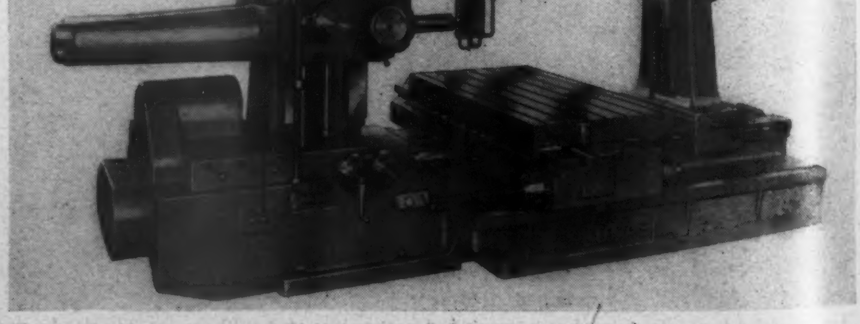
The speed change, milling feed change and distributing gear boxes are in a stationary position on the bed. Only the spindle feed change mechanism is located in the head which is driven directly off the spindle. The spindle final drive covers three ranges, slow, intermediate and fast. The total range of speed varies from a low of 12 r.p.m. to a high of 1,200 r.p.m. to the 4-in. main spindle. High speeds are available for milling or boring as well as for drilling with the rigid main spindle extended a considerable distance, as necessary to reach deeply recessed or offset surfaces.

The machine has four ways, consisting of two conventional ways of hardened steel and two additional hardened-steel roller ways at the outer edges of the integrally cast bed extension. The saddle has roller supports on the two outer hardened ways. The rollers are hardened steel and are adjustable to provide uniform support on inner and outer ways. Leveling wedges, adjustable from outside the widened bed, furnish support at intervals beneath the main ways as well as beneath the roller support bearings at the outer edges of the widened bed.

This horizontal boring, drilling and milling machine is a product of the Lucas Machine Tool Company, 12302 Kirby avenue, Cleveland 8, Ohio.

## Valve and Tool Grinder

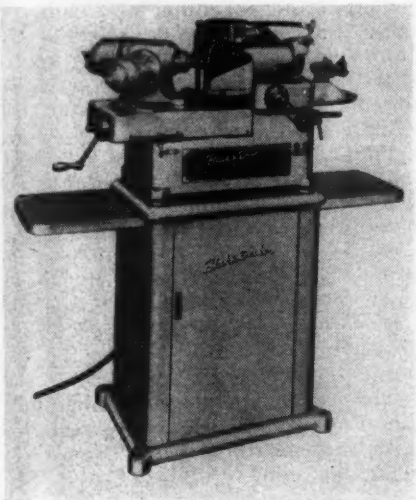
The range of valve reconditioning equipment available from the Black and Decker Manufacturing Company, Towson 4, Maryland, has been expanded to include a No. 6 Universal valve and tool grinder. The machine accommodates flat-head and 15-deg. valves without special attachments or adjustments. Valve stem capacity ranges from 1/4 in. to 1 1/4 in., and the valve head capacity ranges up to 5 1/4 in. The machine has a double-ended wheel spindle as standard equipment which enables it to handle rocker arms, valve stems and tappets.



The Lucas No. 460 horizontal boring, drilling and milling machine is designed with a speed range varying from 12 to 1,200 r.p.m.

Among the features of the grinder is an air chuck which grips or releases the valve stems instantly. The speed of the work head motor is adjustable to accommodate large- and small-sized valve heads. A switch slide bar automatically controls the work head motor so that the motor runs while the valve or tool is being ground and stops when the table moves away from the wheel.

The wheel head assembly can be



**The Black & Decker No. 6 Universal valve and tool grinder handles flat-head and 15-deg. valves with stem sizes from ¼-in. to 1¼-in. and head sizes up to 5¼-in.**

removed and replaced with special grinding attachments such as an internal grinder. The wheel head carriage is movable for grinding large-diameter straight-type tools such as reamers, circular punches and dies.

The grinder face is of welded construction and is rubber mounted on a steel cabinet. Standard equipment includes five twin grip collets, a collet push rod and nose piece for small valves, a rocker arm grinding attachment, a diamond and a cutter-type wheel dresser, a micrometer valve stem grinding attachment and a universal depth gage.

## Electric Pony Express

A new battery-powered electric truck featuring a dual set of controls that

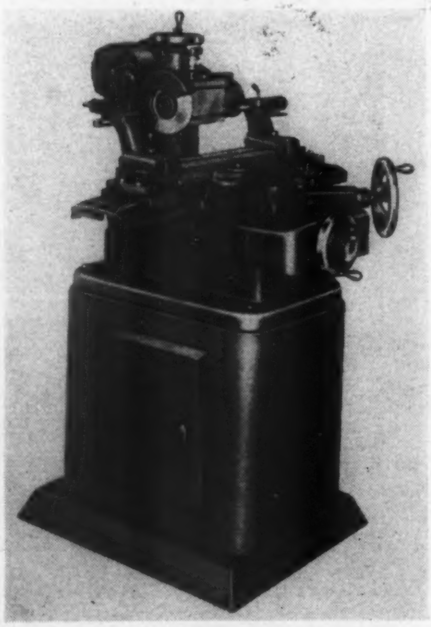
**Electric Pony Express Truck**

permits the operator to walk on either side of it or to ride it, has been placed on the market by Rocky Mountain Steel Products, Inc., 1365 Wall st., Los Angeles 15, Cal. The weight of this new unit is 1,595 lb. and its overall length, including the hitch, is 77 in. The turning radius is said to be 58 in. The hitch or coupler is automatic.

Optional maximum speeds of 6 or 8½ m.p.h. are available with 24- or 32-volt battery. Four speeds forward and the same number in reverse are possible. The purchaser has the choice of seat or back rest.

## Cutter and Tool Grinder

A cutter and tool grinder which, with standard attachments, will sharpen milling cutters, reamers and other cutting tools and which, with extra attachments available from the manufacturer, will handle internal and cylindrical work, grinding chasers, chip breakers and special jobs, is made by the Covel Manufacturing Com-



**The Excel No. 6 universal cutter and tool grinder**

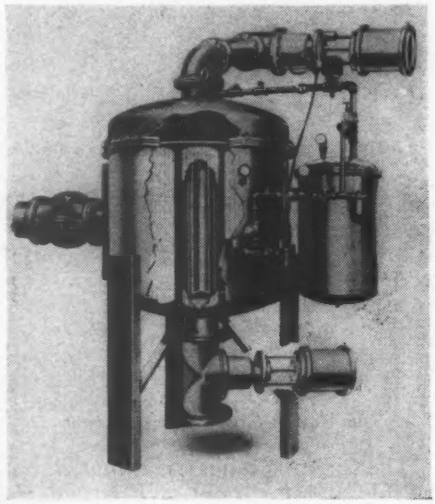
pany, Benton Harbor, Mich. The machine has a capacity for work 8 in. in diameter, or up to 16 in. between centers, and a face-mill capacity of 12 in. diameter over a sub table. The grinder has a table surface 4 in. by 24 in. and occupies a floor space 36 in. by 48 in.

The spindle is V-belt driven from a standard motor and has two speeds which may be changed so that either small- or large-diameter grinding wheels may be used with equal efficiency. Table movement is attained through a hand-feed rack driven by a hardened spiral pinion. Left- and right-hand tail stock, face mill attachments, lip rests, wrenches, and grinding wheels are furnished as standard equipment. The spindle has preloaded precision ball bearings with automatic take-up for wear and end play. This construction permits the use of diamond wheels for carbide grinding.

The face mill attachment has a ball-bearing spindle with an internal taper and three reducing sleeves. This attachment has swivel and tilt adjustments for setting clearance angles.

## Coolant Clarifier

An automatic clarifier to remove abrasives, dirt and other contamination from water-soluble coolants used in grinders, broaches, boring machines,



**Clarifier for removing abrasives, dirt and other contamination from water-soluble coolants**

milling machines, rolling mills, and other metal-working tools is manufactured by the Honan-Crane Corporation, 974 Sixth street, Lebanon, Ind. With the clarifier, coolant is filtered under pressure through mesh screens. A blow-down arrangement. actuated by an electronic timer, disposes of sediment. Particles as small as 5 to 10 microns can be removed.

Seven sizes are available, ranging from a single-tube model with a flow rate of 5 to 15 g.p.m., to one with 37 tubes and a flow rate of 1,000 to 12,000 g.p.m. Over-all lengths range up to 5 ft., with over-all widths from 1⅔ ft. to 5 ft., and heights from 56 to 120 in.

## Sump Cleaner

A sump cleaner for removing chips, grindings, cutting oil or soluble coolant from machine tool sumps, or scale and other contamination from quenching and settling tanks, is available from the Honan-Crane Corporation, 974 Sixth street, Lebanon, Ind. The cleaner transfers oil or coolant from the sump to its tank by vacuum, and no contaminated liquids pass through the pump. The unit will transfer liquids from below floor level with a maximum lift equivalent to a 20-ft. head of water.

A three-way valve changes suction to pressure, permitting the unit to be used for dispensing clean liquids as well as removing dirty liquids. A hermetically sealed mercury contact switch, mounted on the cleaner and actuated by a float lever mechanism, automatically cuts out motor and pump units when the tank is filled. This eliminates the waste of oil or coolant by spillage and insures cleanliness about the machine being serviced. Each unit is equipped with a drain valve for drawing off any liquid with salvage value before dumping.

The Hanan-Crane sump cleaner

The sump cleaner is mounted on wheels and the tank is balanced to permit quick, easy tilting for dumping its contents. Two sizes are available, with either 80- or 125-gal. capacity. Standard equipment includes a ½-hp. repulsion induction motor with V-belt drive, a 10-ft. extension cord with plug and a 10-ft. 1½-in. Neoprene suction hose with a 30-in. nozzle. The pump and motor units are fully enclosed in a sheet metal housing.

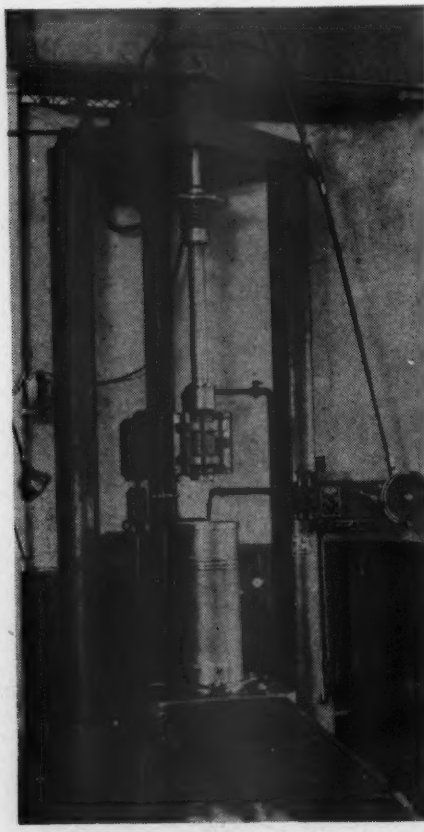
## Handles Long Narrow Pieces

The truck pictured here was designed for handling long narrow pieces of pipe, tubing, bar stock, rods or lumber. Made of aluminum tubing, this new model Rol-Away truck has four casters that enable it roll in any direction. Its dimensions are 72 in. long, 24 in. wide and 34 in. high. Loads are carried on the U-shaped rack between upright standards. Beneath the rack is a shelf which also can be used for carrying various materials. It is manufactured by the Beall Pipe & Tank Co., 1945 North Columbia blvd., Portland 3, Ore.

Truck specially designed for handling long material

## General Purpose Hydraulic Honing Machine

The latest-model heavy-duty general-purpose hydraulic honing machine for railroad shops made by the C. Allen Fulmer Company, 1211 First National Bank building, Cincinnati, Ohio, is designed for the rapid, accurate finishing of Diesel engine cylinder liners up to 15 in. in diameter, air pump cylinders, and reverse gear, stoker, fire door and brake cylinders of all sizes. The machine is said to be capable of finishing piston valve bushings and side rod bores to .0005-in. limits in 8 to 10 min., air pump cylinders, both diameters, in 14 to 16 min., and Diesel liners in from 5 to 12 min.



The Fulmer hydraulic honing machine honing a 12¾-in.-diameter Diesel cylinder liner

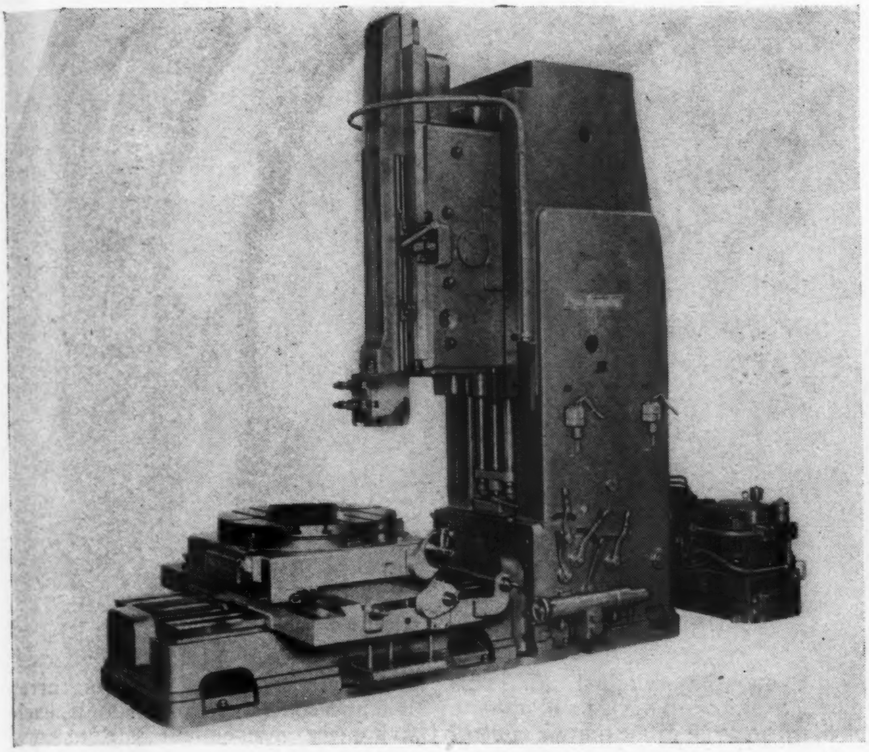
The honing machine has a capacity from 2-in. cylinders up to those of 15-in. diameter. The working stroke is 48 in. The machines are designed to eliminate the need for boring the cylinders prior to honing. The worn cylinder, which may be out of round or tapered as it comes to the honing machine, may be honed from the worn condition directly to the required oversize. Stock removals up to 3/32 in. or ⅛ in. are claimed to be within the economical range of this machine.

For fast stock removal, 15 hp. is applied to the spindle for rotating the honing tool, and 10 hp. used for the reciprocating movement of the spindle. Four spindle speeds are available with reciprocating speeds from 0 to 80 ft. per min.

## Additions to Hydraulic Slotter Line

The line of hydraulic slotters heretofore manufactured only in 12- and 20-in. stroke sizes by the Rockford Machine Tool Company, Rockford, Ill., has recently been augmented by the addition of 36-in. and 48-in. stroke sizes. Both machines have three types of hydraulic feeds: longitudinal, for feed from any point on the table from front to back or back to front; a transverse feed from any point on the table from left to right or right to left; and a rotary feed, clockwise or counterclockwise, from any point on the table radius. During machining operations the shafts or screws for all three movements are driven through a transmission, hydraulically, and by an electric motor for power rapid traverse adjustment during set-up. Longitudinal, transverse, and rotary adjustment for set-up may also be made manually.

The ram slide is swivel trunnion mounted and may be adjusted for tilt to provide travel of the ram in any angular plane between vertical and 10 deg. forward. All controls are conveniently located in relation to the operator's station with full control provided by means of an overhanging pendant and operating levers. For the convenience of the operator, lever controls are installed on both sides of the slotter column. Any cutting speed in the hydraulic range may be obtained quickly by handwheel adjustment. Return strokes are equally fast and may be set independent of the



Rockford hydraulic slotter with a 36-in. stroke

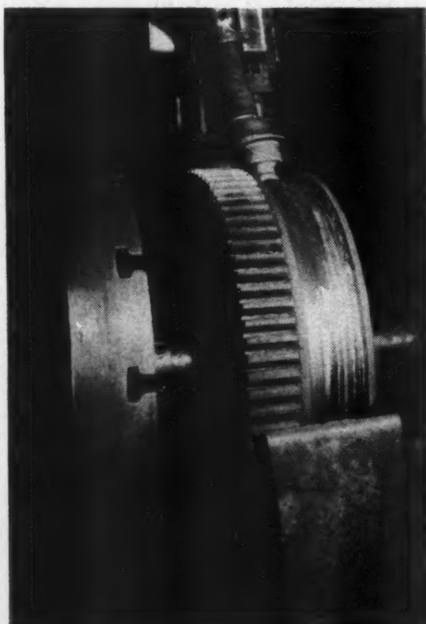
speed of the cutting strokes.

Both sizes of slotters have a minimum length of stroke of 6 in., a distance of 41½ in. from the slots to the center of the circle, and a table travel 42 in. longitudinally and 36 in. transversely. Cutting speeds range from 0 to 80 ft. per min. and all three feeds from 0 to 0.140 in. Tables have a diameter of 42 in. with a removable center 16 in. in diameter and are 36 in. above the floor. The 36-in. slotter has a maximum distance of 54 in. between the table and the bottom of the tool head and a maximum throat clearance, or distance between the bottom of the ram housing and the table surface, of 40 in. The 48-in. slotter is available in three different column heights with maximum distances between the table and bottom of the tool head of 60, 69 or 73 in., and with maximum throat clearances of 46, 55 or 59 in.

## Rebuilding and Flame-Hardening Crane Wheels

Worn crane wheels may be rebuilt by the Unionmelt welding process of the Oxweld Railroad Service Company, unit of Union Carbide and Carbon Corp., New York, at a fraction of the cost of new wheels or of the time required for manual welding. The process also permits flame-hardening the wheel upon completion of the weld which results in a longer-wearing surface than on the original wheel.

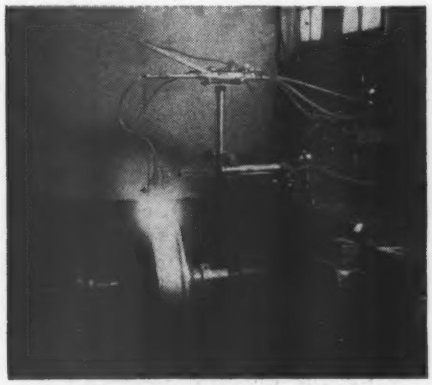
For building-up, the wheel is mounted on a wheel lathe under a Unionmelt U-type head. The wheel is turned under the head at peripheral speed of 15 in. per min. as the rod and granular flux are fed automatically. Following each complete revolution of the wheel the work is stopped and the head is indexed manually to start a deposit alongside the one just completed.



**The Unionmelt welding process building up a worn crane wheel—To the right of the slag is the deposited metal prior to machining**

In one example, with a 0.28 carbon cast-steel wheel, the electrical settings are 550 amp. and 30 volt, using a 3/16-in. No. 296 rod. The melt is No. 90, 12 by 200. The deposited metal is about 7/16 in. wide and 3/16 in. deep. By tilting the welding head, the bead is run onto the side of the flanges the desired distance. The rod as deposited has a Brinell hardness of 200. Excess metal is turned off on the same lathe on which the welding is done. Following the machining operation, the wheel is ready for the flame-hardening operation.

Flame-hardening is performed by the progressive heat-and-quench method with a water coolant. A turning device using a fractional horsepower motor turns the wheel under



**Flame-hardening the crane wheels**

the oxyacetylene flames and quenching head at a speed of 6 in. per min. The heating head is a standard 30-flame type with 20 No. 26 drill-size flame tips, which gives the wearing surface of the wheel a Brinell hardness of 550. The width of the flame pattern is sufficient to harden the flanges as well as the tread.

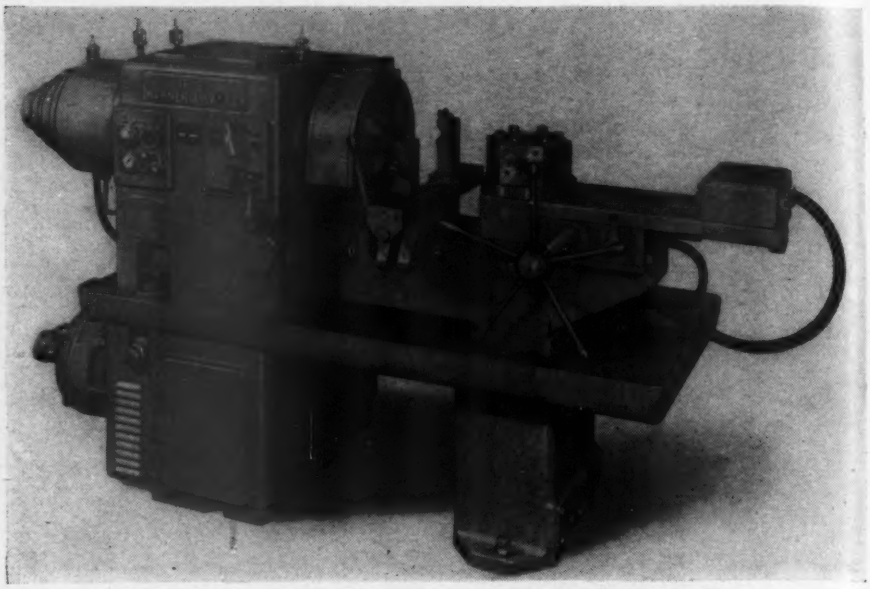
The former manual arc-welding method of building up these wheels required annealing before welding to obtain a good surface and annealing after welding because the manually deposited metal was too hard for machining, which annealing steps are eliminated by using Unionmelt. The manual build-up required about 12 hours with a total time of 22 hours for all steps of reconditioning. By Unionmelt the building up is done in one hour and total reconditioning time is about six hours. The amount of electrode consumed was reduced from 40 lb. to 22 lb.

## Turret Lathe for Non-Ferrous Metals

A 16-in. turret lathe has been designed for non-ferrous metals and trade-named the Electro-Cycle by the Warner & Swasey Co., 5701 Carnegie avenue, Cleveland 3, Ohio. Usable also for the machining of plastics, the lathe was developed with the primary purpose in mind of reducing the time required for such machine handling operations as speed changes, starting, stopping and reversing the chuck for loading, and feeding the tools into the work piece. A variety of speeds are available to keep the machine cutting time to a minimum consistent with the type of work being handled, and an air chuck is incorporated to speed up the tasks of picking up, chucking and unloading the work piece.

Among the applications made of the Electro-Cycle turret lathe to railroad shop work is the machining of brazing sleeves for ⅜-in. outside diameter copper tubing for locomotive unions. The job, starting with rough stick brass ⅞ in. by 12 in., is finished in five operations. The first step consists of turning the outside diameter from ⅞ in to ⅜ in. with a Kennametal turning tool at 1,500 r.p.m. In the second operation the shoulder is turned from 23/32 in. to 9/16 in. In the next two operations the ⅜-in. hole for the tubing and the ¼-in. hole for the choke for the tubing are drilled with high-speed drills, while in the final operation the end of the sleeve is cut off.

The machine has been designated as Electro-Cycle because it features an automatic spindle speed control actuated by the operating cycle of the hexagon turret. After this control has been pre-set, complete automatic control of the headstock for any turret face is achieved, making it unnecessary for the operator to devote any time to spindle positioning, speed changes, starting, stopping and reversing the spindle. Manual operation of the headstock is eliminated. In addition to the above, work handling time has been reduced by the introduction of an automatic spindle positioning device which permits the spindle to stop at the same position each time for convenience in loading. The spindle brake is electrically controlled and the brake limit switch operating cam is adjustable 360 deg. to permit stopping at the most convenient loading position, making it unnecessary to reach around to load or unload. When not required, the positioning device feature may be switched off. This spindle positioning device will operate on either manual or automatic control and may be included as optional equipment.



**The Warner & Swasey 16-in. Electro-Cycle turret lathe**

Two control panels are located on the front of the headstock. The left panel contains complete built-in controls for the air equipment. From the right hand panel the machine can be operated either manually or as an electro-cycle machine. The switches on the electrical control panel select hand-speed control, automatic cycle control or safety stop position, this latter feature being used during set-up to prevent any accidental starting of the machine. The Electro-Cycle control is mounted on the hexagon turret slide and consists of four spools, each having six independent buttons, one for each face. By presetting the buttons on the four spools, any combination of two spindle speeds, spindle reverse, start and stop can be preselected. The cycle control functions on forward, back indexing, and skip indexing and can be set at any time. The buttons for each turret face preset the following functions: automatic spindle starting on the forward motion of the turret slide, stopping the spindle when forward or back indexing, holding the spindle stationary during the forward motion of the slide, maintaining the spindle rotation throughout indexing, and forward motion of the slide. The automatic reverse spool controls the automatic reverse of the spindle for each turret face. The spindle can be automatically reversed at the end of the work stroke by means of regular stop screws and can be made to continue running in reverse for the succeeding stations, where left hand reamers are used, or return to forward speed when the turret is again indexed. A third position of the button renders the reverse control inoperative. Three types of cross-slide feeds are available—lever feed, screw feed or a combination lever and screw feed.

The lathe has a swing of 16⅞ in. over the bed and 9 in. over the cross slide. The head and bed are cast in one piece, and the bed width is 7½ in. The hole in the collet chuck plunger is 1-9/16 in. Capacities of the chuck are 1½ in. for round stock, 1-1/16 in. from square, and 1-5/16 in. for hexagon. The total cross travel for the lever-feed cross slide may be either 5½ or 8 in., while for the screw-feed it is 8 in. The longitudinal travel is 15-5/16 in. Tool interchangeability is such that Warner & Swasey No. 2, 3 or 4 universal turret lathe tooling may be utilized in the Electro-Cycle lathe.

**Turning the shoulder on a brazing sleeve for a locomotive union on the Electro-Cycle turret lathe**

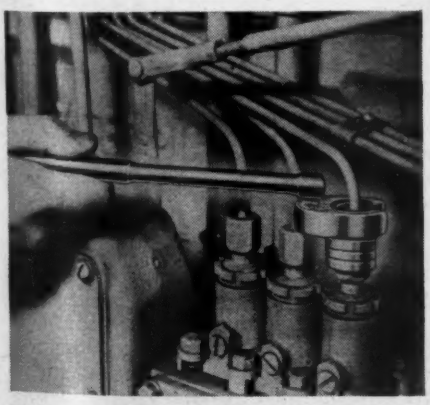
## Open-End Ratchet Wrench

An open-end ratchet wrench for use on piping, tubing, conduit, cable and rod fittings where an ordinary ratchet wrench cannot be used has been developed by the D. J. Hendry Company, 27 Main street, San Francisco, Calif., and named the T-A-C wrench. Open-end

**The T-A-C open-end wrench showing the swivel connection between the handle and the ratchet which permits the wrench to be used either with the handle in the position shown above or perpendicular to this position**

sockets used in conjunction with this wrench come in 1/16-in. steps from ⅜-in. to 1 1/16-in. Two different style ratchet handles are used. The handle used with sockets from ⅜ to 11/16-in operates with a minimum ratchet turn of 7½ deg.; the handle for the larger-sized sockets operates in an arc as small as 5 deg.

The handle is attached to the socket end through a swivel joint which per-

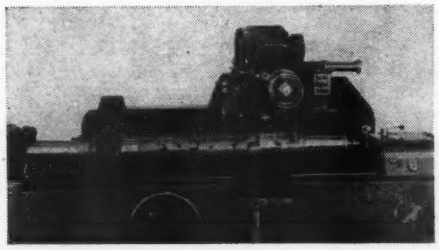


**Using the T-A-C ratchet wrench with the handle in the second position**

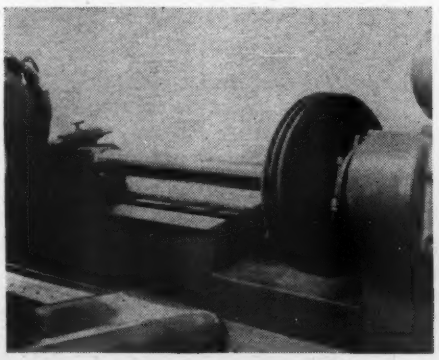
mits the ratchet to be used to pull in the manner of an ordinary open-end wrench or to exert its force in the manner of a conventional socket wrench with an extension handle. A rigid head and a socket adapter are also available for use with the open-end ratchet wrench, the latter permitting the use of standard sockets.

## Hydraulic Gap Grinding Machine

The Landis Tool Company, Waynesboro, Pa., is manufacturing a plain hydraulic gap grinding machine having a 16-in. swing over the table and a gap in the table to swing 40-in. projections. Known as the type FF, the grinder is made in four lengths between centers—96 in., 120 in., 144 in., and 168 in. with a work capacity up to 10,000 lb. between centers. On standard machines the gap is 18 in. wide and is located at the headstock end of the table. If the nature of the work is such that a wider gap or different location is required, the machine may be modified to suit the requirement. Standard equipment includes



**A 16-in.-by-120-in. gap grinder showing the regular wheel back and the auxiliary wheel in grinding position**



**A Landis gap grinder 16 in. by 144 in. with a piston and rod in place over the gap in the table**

a fill piece for the gap and a work table that can be swiveled to grind tapers. The main grinding wheel is 30 in. in diameter.

This machine is adaptable to such railway shop applications as grinding locomotive piston rods, steam and Diesel locomotive axles, and other machine parts with large projections. Traverse speeds are infinitely adjustable from 3 in. to 90 in. per min. Taper adjustment of the swivel table is at the heavy headstock end, with a built-in dial indicator for taper adjustments. Carriage tarry adjustment for traverse grinding may be made at the operator's position, and tarry at either end or both ends may be selected. A variety of grinding-wheel feeds may be had to suit the grinding set-up. They may be either electric or hydraulic or combinations of the two. Straight infeed for plunge grinding or feeds at each carriage reversal may be had on these machines.

A safety pressure switch prevents rotation of the spindle until a predetermined pressure is built up in the filtered oil lubricating system. Failure of the system will automatically stop spindle rotation. The lubricant used for the carriage guides is pumped from a separate reservoir in the bed. This system also has a safety pressure switch and filter. If this system should fail due to broken lines or lack of oil, all motors on the machine will stop. Telescoping guide covers protect the carriage guides from foreign matter regardless of the position of the carriage. The bed guides are made long enough so that neither the headstock nor footstock ever over-hangs the ends of the bed in the extreme positions.

The headstock is constructed for complete vee-belt drive from the motor to the jackshaft and from the jackshaft to the face plate. A spindle-speed-indicating tachometer mounted flush on the headstock is available. A reversible hydraulic motor is used for moving the carriage. The drive from the motor is through a gear train to a lubricated rack pinion. This type drive is used for all lengths and eliminates any reversing-gear mechanism. The bed has built-in leveling screws. A 180-gal. coolant reservoir, complete with settling baffles and a cleanout lip is cast in the bed.

An auxiliary fillet-grinding attachment for use when finishing railroad axles and similar parts is also available to fit the Landis gap grinder and to make it possible to finish grind a railroad driving axle in one set-up. The auxiliary fixture consists of a complete grinding fixture with a 5-hp. driving motor and a wheel spindle mounted on the eye-level wheel-feed handwheel housing and assembled so that it may be revolved about this housing. With this arrangement, the complete grinding-wheel spindle may be pivoted up out of grinding position when grinding with the standard 30-in. grinding wheel. When radii are to be ground the auxiliary grinding unit is pivoted hydraulically down into grinding position and the standard wheel retracted hydraulically from grinding position. Table-mounted radial wheel dressers are used to form the two different radii on the wheels.

## Rod for Welding And Brazing Copper

A torch welding rod for a number of production applications called for in the joining of copper has been developed by the Eutectic Welding Alloys Corporation, 40 Worth street, New York 13. Known as the Eutecrod 1805FC, the rod may be used with a torch adjusted for a slight oxidizing flame, or with atomic hydrogen or twin carbon arc where no oxyacetylene equipment is available. Flux-coated with an improved coating for greater capillary action and greater

speed of application, this rod may also be used with its companion flux, Eutector Flux 1805, to reduce welding heat and avoid distortion and stress.

Eutecrod 1805FC is a thin-flowing, low-melting brazing-type alloy with a tensile strength of 90,000 lb. per sq. in. and a Brinell hardness of 160-180. It is available in sizes of ¼ in., 3/16 in., 3/32 in. and ⅛ in. flux-coated and in 1/16 in. bare rods.

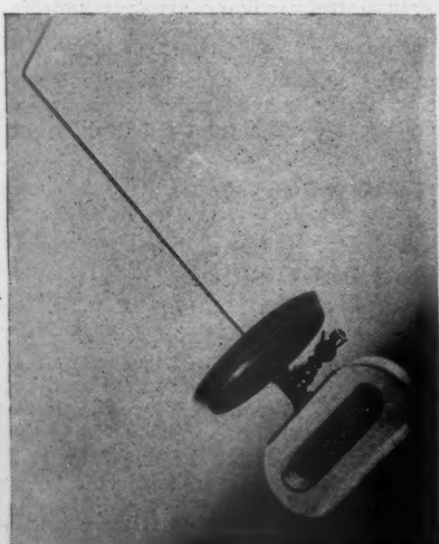

**Sample welds made on copper with Eutecrod 1805FC, flux-coated for lowest heat applications**

## Hot-Water Telltale-Hole Cleaner

The Flannery Bolt Company, Bridgeville, Pa., has designed a tool, using hot water, to clean telltale holes in hollow flexible staybolts. The tool is operated manually by working the cleaner in and out of the telltale hole with a twisting motion, while a trickle of hot water flows into the hole through a hollow cleaning drill. The water, which must be hot, (approximately 120 deg.) to permit the tool to operate easily and properly, should be supplied through a light, flexible lead hose.

The porous-cement plug should be removed with the regular plug breaker before using the water tool. When the telltale hole is entirely clean as indicated by the electric contact tester the water should be blown from it by using the air tool with a piece of waste to absorb the water.

Telltale holes should be reamed as usual and the porous plug applied.



**Hot water through the hollow cleaning drill is used to clean out staybolt telltale holes**

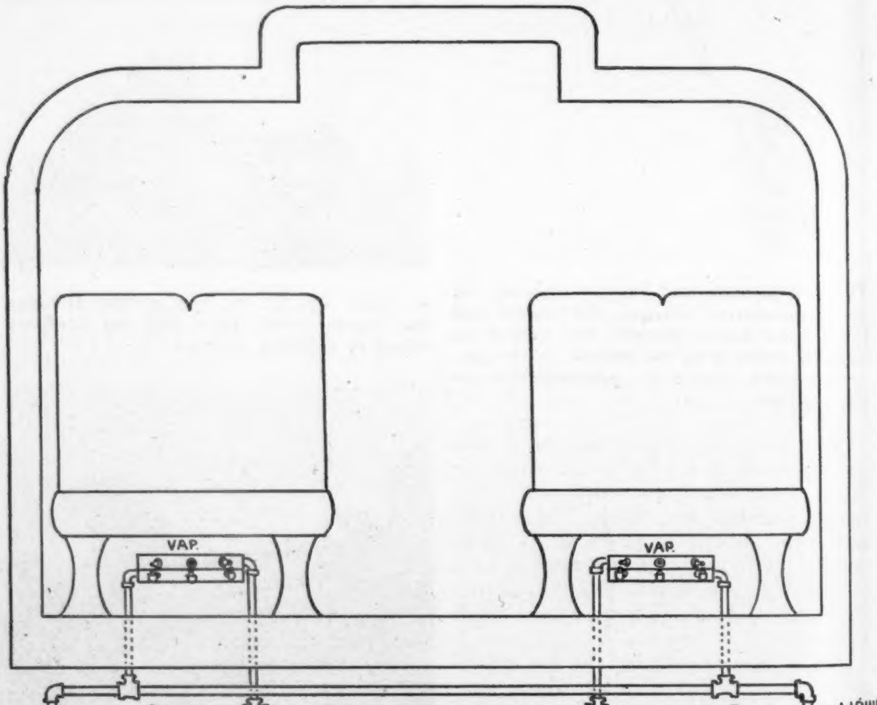
## Externally Connected Insecticide Vaporizer

Workmen no longer need to enter Monon passenger cars to spray insecticide since the installation of Enoz permanent raildoad vaporizing equipment, manufactured by the Diversey Corporation, 53 West Jackson Boulevard, Chicago 4. The vaporizers are permanently mounted on the inside of the car where they are not visible to the passengers, and are connected to a pipeline which extends to the outside center area of the car. To spray the car, a container of insecticide is attached to the liquid line and an airhouse connected to an air line. With the car closed up, the air is turned on and the car completely treated within a few minutes.

The heavy vapors of the insecticide travel the entire length of the car along the heating pipes, on each side, and on the floor where insect infestation is usually the heaviest. The lighter vapor rises so that complete fogging of every area of the car is accomplished with little or no wetness and condensation.

The two permanent vaporizers used in coaches are located in the approximate center of seats on both sides of the middle of the car. In the dining and dining-parlor cars the vaporizers are installed on the walls of the pantry and kitchen. These vaporizers are most effective in the pantry and kitchen area but are of sufficient capacity to fill the entire car with the insecticide. The exterior piping which feeds the insecticide to the permanent vaporizers comprises one length of ¼-in. pipe for the liquid and one length of ⅜-in. pipe for the compressed air. The flow of air in the latter creates a vacuum which fogs the liquid and carries it through the first pipe into the car.

The exterior connections are capable of supplying the interior of the car with a quart of vaporized insecticide in about 2 min. The entire operation, including making and breaking the connection and spraying requires about 10 min.

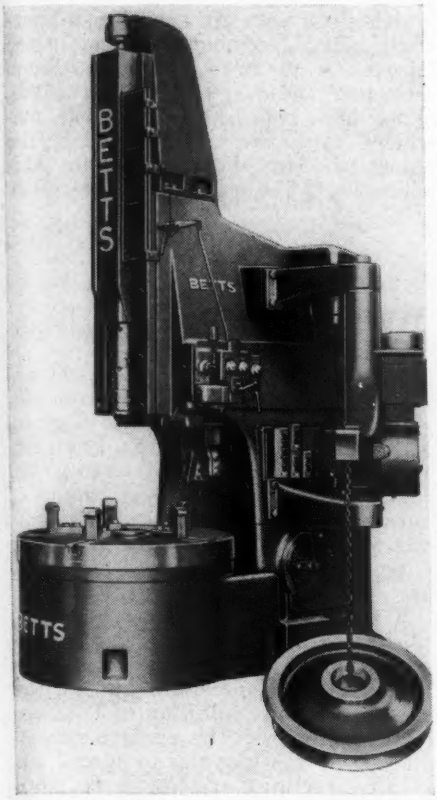



**The Enoz externally connected system of insecticide spraying is applicable to passenger cars of all types, new or old**

## Car Wheel Borer

The latest model high-speed Betts hydraulic-feed car wheel boring and hub facing machine manufactured by Consolidated Machine Tool Corporation, Rochester 10, N. Y., has all of the push buttons and control levers grouped close together for operational simplicity. Among the features incorporated in the machine are an automatic table brake in conjunction with the automatic feed and traverse cycle, and an automatic control that stops the table before the spindle starts its upward traverse in order to prevent scoring of the work piece.

The machine can deliver both the high




**The Betts hydraulic-feed car wheel boring and hub facing machine, shown here equipped with an electric hoist, may have either one or two electric or pneumatic hoists**

speeds necessary for the use of carbide tools as well as a suitable range for high-speed-steel tools. An electrical automatic speed reduction between the roughing and finishing speeds may be furnished when desired, making it possible to use a combination of carbide and high-speed-steel tooling.

The capacity of this machine is 17-in. to 48-in. cast-iron or steel wheels using a five-jaw automatic self-centering chuck. It may be equipped with either one or two electric or pneumatic hoists. The table is completely sealed for use of coolant if desired.

## Cutter Grinder

A cutter grinder for finishing the face, periphery, and corners of face milling cutters in one setting has been developed by The Ingersoll Milling Machine Company, Rockford, Ill. This feature is made possible by the fact that the grinding wheel spindle is always in the plane with the axis of the cutter and at the same time can be set at different angles to that axis, or can be rotated in an arc over the cutter. The cutter to be ground is mounted on the grinder spindle in a manner similar to the method of cutter mounting used on a milling machine spindle for accurate grinding of the teeth in correct relation to the axis and to the cutter mounting face.

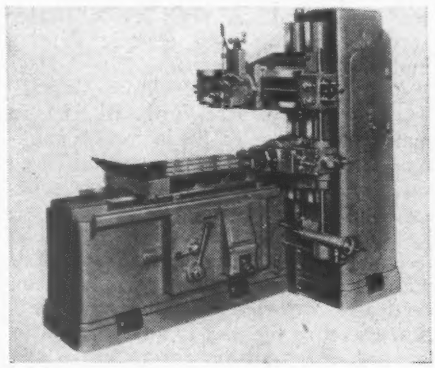
This cutter grinder will grind face milling cutters from 4 in. to 30 in. in diameter with a maximum face of 7 in. in width. Face mills as small as 2 in. in diameter can be ground if there is sufficient clearance for the grinding wheel to take a full pass over one tooth without contacting adjacent teeth. It will also grind solid-shank inserted-tooth cutters, both concave and convex radius cutters up to 2½-in. maximum radius, staggered tooth cutters, angular-face milling cutters within the range of the machine, and the ends of helical end mills by using a special attachment. The corners may be ground square, angular, or with any radius up to 2½ in. without resetting the cutter.

The cutter spindle revolves on anti-friction bearings in a quill held vertically in a saddle. The saddle slides horizontally on hardened and ground steel ways in the base of the grinder. Hand wheels at the front of the machine provide micrometer adjustment vertically to the quill and horizontally to the saddle.

The grinding wheel spindle runs in anti-friction bearings. This wheel head assembly is mounted on tapered anti-friction rollers running between hardened steel ways. Two of the rollers are mounted on eccentric centers for ease of adjustment. The U-shaped yoke carrying the wheel head assembly is made to swing through an arc of 96 deg., 3 deg. below horizontal to 3 deg. past vertical, or may be clamped in position to grind at any angle within this arc. It is mounted on anti-friction bearings and is counter-balanced by springs so that it may be moved easily.

## Openside Hydraulic Shaper

The Rockford 36-in. openside planer hydraulically reciprocates the work under the cutting tool on a box-section table, which is supported on a double-length bed to eliminate overhang. The tool slide has a power feed up and down



**The Rockford 36-in. openside planer has hydraulic table speed and tool feed infinitely adjustable within its range**

with micrometer graduations, and gives support to the adjustable clapper box which carries a planer-type tool clamp.


**The Ingersoll cutter grinder**

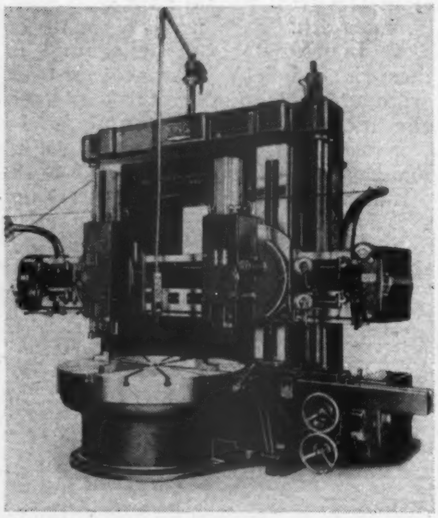
Both the speeds and feeds are infinitely adjustable throughout the range of the machine, providing any desired combination of table speeds and tool feeds.

The hydraulic table-drive controls are in three groups in one panel, one to select the cutting-speed range, a second to give adjustment to any rate in the selected range, and a third to start and stop the table-drive. There are centralized controls for engagement of the power feed to the rail head in either direction, for the tool slide up or down, and for the manual adjustment of both. Micrometer dials show the amount of tool movement. A push-button station starts and stops the electric driving motor.

This product of the Rockford Machine Tool Company, Rockford, Ill., has a maximum stroke of 38 in. and a minimum stroke of 1 in. The cutting speed range varies from 0 to 110 ft. per min., and the return speed of the table is adjustable from 0 to 150 ft. per min. The feed to the cross rail head is from 0 to 0.125 in. horizontally and 0 to 0.0625 in. vertically, with an 8-in. maximum vertical travel of the tool in any position of the rail. The cutting forces are 8,000, 4,900 and 3,100 lb. at 40, 70 and 110 ft. per min. respectively. The ways are 74 in. long. The table working surface is 21½ in. by 36 in., with a total table length of 48 in. The distance from the table to the cross rail is 24 in. with a standard column and 32 in. with an extra high column.

## Vertical Boring And Turning Machines

The latest series of King boring and turning machines have been designed to be particularly adaptable to the rapid, accurate, and economical production of cylinder bushings, tires, wheels, wheel centers, and other railroad shop operations including crossheads, valve bushings, driving boxes, crown brasses, and the smallest bushings. The machines have a wide range of feeds and speeds, including those suitable for carbide tools. All controls are located at the front of the operator. On-the-spot adjustments are accomplished with angular hand-adjustment levers. These levers, fitted with micrometer dials for vertical or horizontal movement of the head or turret, are an integral part of the head and move with it. The rectangular-type ram heads have eight bearing surfaces and a saddle that is square locked and fitted with four taper gibs for accurate alignment.



**The 72-in. double-column King boring and turning machine**

King machines are available in a variety of head combinations and in ten sizes—30-, 36- and 42-in. single-column machines and 52-, 62-, 72-, 84-, 100-, 120-, and 144-in. double-column machines. They are manufactured by the American Steel Foundries, King Machine Tool Division, Cincinnati 29, Ohio.

## Water Additive For Fighting Fire

A chemical to make "water wetter" for fire fighting is available from the American-LaFrance-Foamite Corp., Elmira, N. Y. Known as Pentrate, this formula, when dissolved in water in a 1 per cent solution, gives the mixture penetrating and spreading qualities much superior to water itself and, therefore, more effective in fire fighting.

The principle of Pentrate can be illustrated by considering a rain drop on a window, which is prevented from flattening and spreading out by the surface tension. Addition of Pentrate to the water frees this surface tension and allows the globules to spread out in all directions and to cover more area. In this way the water has greater opportunity to spread and penetrate and to soak into an object that is on fire. It can also cover broken or rough surfaces more readily and can penetrate more deeply into fires occurring on such materials as mattresses and waste.

Pentrate is no more injurious to metals or wood than water itself. It is said to have even less corrosive effect than water and it can be used effectively with salt water or calcium chloride solutions.

**The Delaware & Hudson's daylight Montreal-New York train, the "Laurentian," at Waterford, N. Y.**

# NEWS

## Gas-Turbine Loaned to Locomotive Committee

UNDER a co-operative agreement announced by James Boyd, director of the Bureau of Mines of the Department of Interior, a large gas-turbine once destined for Russia under the lend-lease program, will be made available to the Locomotive Development Committee of Bituminous Coal Research, Inc., for experimentation in the use of pulverized coal as a fuel for gas-turbine locomotives. The information gained from these tests will be used in completing the design of two experimental coal-burning gas-turbine locomotives now being constructed by the committee. The 40,000-cu. ft.-per-min. unit was obtained by the bureau from the War Assets Administration.

Following the committee tests, which will be conducted at its laboratory in the Dunkirk, N. Y., plant of the American Locomotive Company, the gas-turbine will be returned and the data obtained will be made available to the bureau for use in its allied research on the production of synthetic liquid fuels from coal. According to the bureau, the committee, supported by nine major railroads and four coal producers, is working a $2,800,000 research program designed to adapt powder-fine bituminous coal to the gas turbine.

## Steam Locomotive Research Institute to Continue Work

THE board of directors of the Steam Locomotive Research Institute has announced that it will appoint a director of research to succeed the late Lawford H. Fry, director of research of the institute at the time of his death on July 11. It is the intention of the directors of the institute that the work of this organization will be continued.

## Simmons-Boardman Appointments

S. WAYNE HICKEY, vice-president of the Simmons-Boardman Publishing Corporation and heretofore district manager of advertising sales, transportation papers, with headquarters at Chicago, has been named vice-president, advertising sales, transportation papers, a newly-created position. Mr. Hickey will have offices in both Chicago and New York. C. Miles Burpee, vice-president of the corporation in general charge of advertising sales on the transportation papers, has been named vice-president, sales promotion and service, transportation papers. His headquarters will be at New York as heretofore. He will continue also as business manager of Railway Age and will be publicity director of the company's transportation cyclopedias. John R. Thompson, formerly vice-president and treasurer of the Maclean-Hunter Publishing Corporation, with headquarters at Chicago, has been appointed district manager of advertising sales, transportation papers, at Chicago, succeeding Mr. Hickey.

## A.S.T.M. Nominations

RICHARD L. TEMPLIN, assistant director of research and chief engineer of tests, Aluminum Company of America, has been nominated president of the American Society for Testing Metals for 1948-1949, and L. J. Markwardt, assistant director, U. S. Forest Products Laboratory, vice-president.

## C. D. Young Receives Henderson Medal

CHARLES D. YOUNG, who retired on May 31 as vice-president in charge of purchases, stores and insurance of the Pennsylvania, has been named the 1948 recipient of the Henderson Medal of the Franklin Institute. The medal will be awarded by Richard T. Nalle, president of the institute, at ceremonies in Philadelphia, Pa., on October 20, in consideration of Mr. Young's "contribution to the scientific advancement of the steam locomotive which has resulted in improving the reliability and efficiency and reducing the cost of steam locomotives, thereby producing a more effective transportation unit."

## Orders and Inquiries for New Equipment Placed Since the Closing of the August Issue

LOCOMOTIVE ORDERS

| Road | No. of locos. | Type of loco. | Builder |
|---|---|---|---|
| New York, Chicago & St. Louis | 10[1] | 2—8—4 | Lima-Hamilton |
| | 9[1] | 1,000-hp. Diesel-elec. switch | Fairbanks-Morse |
| | 4[1] | 1,000-hp. Diesel-elec. switch | Lima-Hamilton |
| Texas & Pacific | 6[2] | 6,000-hp. Diesel-elec. frt. | Electro-Motive |
| | 4[2] | 4,500-hp. Diesel-elec. frt. | Electro-Motive |
| | 1[2] | 4,000-hp. Diesel-elec. pass. | Electro-Motive |

FREIGHT CAR ORDERS

| Road | No. of cars | Type of car | Builder |
|---|---|---|---|
| Bangor & Aroostook | 100[3] | 50-ton pulpwood | Magor Car |
| Chesapeake & Ohio | 1,000[4] | 70-ton hoppers | American Car & Fdry. |
| Clinchfield | 35[5] | 70-ton covered hoppers | American Car & Fdry. |
| Copper Range | 8[6] | 50-ton box | Pullman-Standard |
| Delaware & Hudson | 300[7] | 50-ton box | Company shops |
| | 250[7] | 50-ton gondola | Company shops |
| Delaware, Lackawanna & Western | 500[8] | 50-ton hopper | American Car & Fdry. |
| Grand Trunk Western | 500[9] | 50-ton box | American Car & Fdry. |
| | 200[9] | 50-ton box | Pullman-Standard |
| Gulf, Mobile & Ohio | 500[10] | 50-ton gondola | American Car & Fdry. |
| | 500[10] | 50-ton hopper | Pullman-Standard |
| Kansas City Southern | 400[11] | 70-ton hopper | Pullman-Standard |
| Mather Stock Car Co. | 100[11] | 40-ton refrig. | Company shops |
| Missouri Pacific | 1,000[12] | 70-ton gondola | Company shops |
| St. Louis-San Francisco | 1,000[13] | 55-ton hopper | Pullman-Standard |
| Seaboard Air Line | 150[14] | 70-ton hopper | Pullman-Standard |
| | 100[14] | 70-ton covered hopper | Pullman-Standard |
| | 200[14] | 70-ton covered cement hopper | Greenville Steel Car |
| Western Maryland | 50[15] | 50-ton automobile | Greenville Steel Car |

FREIGHT CAR INQUIRIES

| Road | No. of cars | Type of car | Builder |
|---|---|---|---|
| Mississippi Central | 200 | 50-ton box | .......... |
| Virginian | 1,000 | 55-ton hopper | .......... |

[1] These 2—8—4 locomotives will have roller bearings on the engine truck and drivers and will cost $2,252,000. Delivery is expected in December, 1948, and January, 1949. The Diesel locomotives will cost approximately $1,300,000, and their deliveries are scheduled for December, 1948, and January, 1949.

[2] Deliveries to begin in March, 1949.

[3] Delivery expected during second quarter of 1949.

[4] To be of all-welded construction. Cost, $4,000,000.

[5] For July, 1949, delivery.

[6] For delivery in November. Delivery of fifteen 50-ton box cars previously ordered from Pullman-Standard was expected in August.

[7] For delivery in second and third quarters of 1949.

[8] For 1949 delivery.

[9] Deliveries of both lots are scheduled for the first quarter of 1949. The road also has reported it is completely rebuilding 600 40½-ft. box cars in its Port Huron, Mich., shops.

[10] Delivery of gondolas scheduled for early in the third quarter of 1949. Delivery of hoppers expected during second quarter of 1949.

[11] For delivery early in 1949.

[12] Construction to begin in February, 1949, in the road's De Soto, Mo., shops. 500 of these cars are for the Gulf Coast Lines and 500 for the International-Great Northern.

[13] Delivery scheduled for second quarter of 1949.

[14] Delivery of Pullman-Standard cars scheduled to begin next January. Delivery of the Greenville cars scheduled to begin early in 1949.

[15] For delivery during the first quarter of 1949.

NOTES: *Chicago & North Western.*—The interiors of 100 roller-bearing steel-and-aluminum passenger cars now operated in Chicago suburban service by the Chicago & North Western are scheduled to be completely redecorated, at a cost of $7,000 per car. The cars will be converted into de luxe coaches featuring attractive pastel colors, bright seat upholstering, colorful tile floor covering and other changes designed for greater attractiveness and comfort. Work is already under way and it is expected that 28 cars will be refurbished this year. In conjunction with the suburban coach improvement program, the road has installed new generators on suburban locomotives to increase by 100 per cent the lighting intensity on 77 trains.

### *Railway Mechanical Engineer* Editorial Appointments

Clair B. Peck, managing editor of the *Railway Mechanical Engineer*, has been appointed editor of the *Railway Mechanical Engineer* and editor of the Locomotive Cyclopedia and the Car Builders' Cyclopedia, succeeding the late Roy V. Wright. C. B. Tavenner, assistant managing editor of the Railway Age, succeeds Mr. Wright as managing editor of that publication. Mr. Peck continues also as mechanical department editor of the Railway Age. Harold C. Wilcox, associate editor of the *Railway Mechanical Engineer* and the Railway Age, succeeds Mr. Peck as managing editor of the *Railway Mechanical Engineer* and continues as associate editor of the Railway Age at New York. Edgar L. Woodward remains in charge of mechanical department matters in the western territory as western editor of the *Railway Mechanical Engineer* and western mechanical department editor of the Railway Age at Chicago. The growing importance of that territory has led to the recent addition of Gerald J. Weihofen to the mechanical department staff at Chicago. Charles L. Combes, associate editor of the *Railway Mechanical Engineer* and the Railway Age, has been appointed also managing editor of the Locomotive Cyclopedia and the Car Builders' Cyclopedias at New York.

C. B. Peck

Mr. Peck was born in Pierson, Mich., on June 24, 1884. He attended the public schools of Belding, Mich., and the Michigan State College where he received his B.S. in M.E. in 1907. He became a draftsman in the employ of the Duluth, South Shore & Atlantic at Marquette, Mich., in 1907. In 1911 he became an employee in the mechanical engineer's office of the Atchison, Topeka & Santa Fe at Topeka, Kan., in charge of locomotive pattern records and on special assignments. In 1914 he became associate editor of the Mechanical Edition, Railway Age Gazette at New York; in 1919, western mechanical editor of the Railway Age and *Railway Mechanical Engineer*, at Chicago, and in 1923, mechanical department editor, Railway Age, and managing editor, *Railway Mechanical Engineer*, at New York. Mr. Peck is a fellow of the American Society of Mechanical Engineers and an associate member of the Mechanical Division, Association of American Railroads. He was chairman of the Standing Committee on Professional Divisions and also chairman of the Railroad Division of the A.S.M.E. in 1934. During 1941 and 1942 he was chairman of the Standing Committee on Publications and for the next two years was a vice-president and member of the Executive Committee of that society.

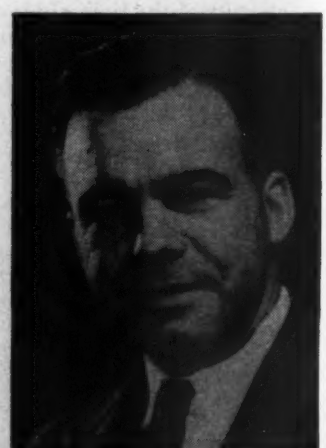
Mr. Wilcox was born at Honesdale, Wayne Co., Pa., on August 28, 1892. He received his education in the grade and high schools of Scranton, Pa., and at the John B. Stetson University, DeLand, Fla. (1913). He entered railway service as a shop draftsman in the employ of the Delaware, Lackawanna & Western at Scranton. In 1916 he became designer of semi Diesel marine engines for the Remington Oil Engine Company, Stamford, Conn.; in 1918, designer of power plant mechanical equipment for the D.L. & W.; in 1919, supervisor of stationary-boiler inspection and maintenance; in 1920, mechanical pilot, valuation department, I.C.C. Order No. 8; in 1921, assistant to mechanical engineer —power plant, shop and engine terminal equipment. In 1924 he joined the editorial staff of the *Railway Mechanical Engineer* and the Railway Age as associate editor at New York. In 1925 he was appointed editorial representative of the two publications at Cleveland, Ohio. In 1933 he returned to New York as associate editor of the *Railway Mechanical Engineer* and the Railway Age and as editor, Shop Section, Locomotive Cyclopedia and Car Builders' Cyclopedia. Mr. Wilcox is a member of the American Society of Mechanical Engineers. From 1939 to 1941 he served on the General Committee, Railroad Division, of that Society.

H. C. Wilcox

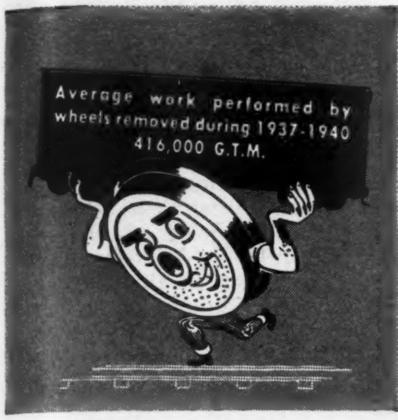
Mr. Woodward was born on August 2, 1889, in North Waterboro, Me. He received his B.S. in M.E. at the Massachusetts Institute of Technology in 1911. He then became a special apprentice at the West Albany, N.Y., shops of the New York Central. From 1913 to 1917 he served in various capacities—as airbrake repairman, machinist, schedule supervisor, locomotive inspector, and acting gang foreman—at the Billerica, Mass., shops of the Boston & Maine. In 1917 he became associate editor of the *Railway Mechanical Engineer* and Railway Age at New York. During World War I he was a sergeant, U.S. Railway Engineers, with the A.E.F. In 1919 he returned as associate editor of the *Railway Mechanical Engineer* and the Railway Age. In 1923 he was appointed western editor, *Railway Mechanical Engineer* and western mechanical editor, Railway Age, at Chicago. Mr. Woodward is a member of the executive committee of the Car Department Officers' Association and secretary of the Railroad Division, American Society of Mechanical Engineers.

E. L. Woodward

Mr. Combes was born at Milford, N.Y., on September 15, 1905. He attended the Public schools of Oneonta, N.Y., and is a graduate in mechanical engineering of Cornell University (1930). From 1923 to 1924 he was a helper in the car department of the Delaware & Hudson, and during 1927 and the summers of 1928 and 1929 was a yard clerk and switchtender in the employ of the D. & H. From 1930 to 1937 he was a special student, motive power department, D. & H. He was appointed test engineer in 1937 and in 1938 went to Troy, N.Y., as production engineer



C. L. Combes




# THE TOUGH GUY GIVES MORE SERVICE TODAY


That fellow we call The Tough Guy, the Chilled Car Wheel, is even tougher these days than he was a few short years back. Let us mention some statistics that prove it.

Serving under regular railroad freight cars, wheels removed in the four years just past, delivered 32.4% more service than those removed during an earlier four year period. The figures: *average work performed by wheels removed during 1944-1947 was 551,000 Gross Ton Miles as against 416,000 for 1937-1940.*

Behind the statistics is the combined specialized talent and hard work of many people. Among them is the entire AMCCW staff which includes research metallurgists and testing laboratory personnel as well as experienced resident inspectors, traveling inspectors and supervisors. Among them also is a large corps of volunteers from the entire chilled car wheel industry — representatives of member companies who are active and thorough in serving on committees for which their duties and abilities particularly qualify them.

**ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS**
445 NORTH SACRAMENTO BOULEVARD, CHICAGO 12, ILL.
American Car & Foundry Co. • Canadian Car & Foundry Co. • Griffin Wheel Co.
Marshall Car & Foundry Co. • New York Car Wheel Co. • Pullman-Standard Car Mfg. Co.
Southern Wheel (American Brake Shoe Co.)


*For additional information, use postcard, pages 49, 50*

for W. & L. E. Gurley. He came to New York in 1939 as associate editor of the *Railway Mechanical Engineer* and the Railway Age. He was on active duty with the Army of the United States from 1941 until 1945, serving as battery officer, 52nd Coast Artillery; instructor, Coast Artillery school; executive officer, Harbor Defenses of Los Angeles, Calif.; chief, editorial branch, research and development service, Ordnance Department, and captain, Field Artillery Reserve. In 1945 he returned to the positions of associate editor, *Railway Mechanical Engineer* and Railway Age. He is now also managing editor of the Car Builders' Cyclopedia and the Locomotive Cyclopedia. Mr. Combes is a member of the American Society of Mechanical Engineers. He was secretary of the Railroad Division of that Society from 1940 to 1941.

Mr. Weihofen was born in Chicago on April 15, 1918. He received his B.S.

**G. J. Weihofen**

in M.E. from Purdue University in 1940. He was in the employ of the Erie from June, 1940, until February, 1943, and in the service of the U.S. Navy from the latter date until March, 1946. In April, 1946, he became associate editor of the *Railway Mechanical Engineer* and the Railway Age, at New York. In October, 1947, he was transferred to the mechanical department staff at Chicago.

## Diesel Power in 1955

At least 40,000,000 hp. of Diesel locomotives will be at work on the nation's railroads by the end of 1955, compared with the present 7,000,000 hp., J. W. Barriger, president of the Chicago, Indianapolis & Louisville, told the Society of Automotive Engineers at a meeting in French Lick, Ind., on June 10.

He predicted the use, within the next few years, of larger Diesel engines which would allow more than 2,000 hp. to be placed in one cab of a road locomotive. The present small diameter driving wheels mounted on swivel trucks and directly geared to a single motor will not be standard practice much longer, he declared, adding the opinion that, in the future, two large motors will turn each pair of wheels.

The Monon president told his audience that he felt the next 10 to 12 years would bring about as much railroad progress as has occurred in the first 120 of railroad history. Locomotives of 12,000 hp. will be common standard in 1960, he said.

## Malleable Founders Election

Collins L. Carter, president of the Albion Malleable Iron Company, was elected president of the Malleable Founders Society for the coming year at the society's recent annual meeting. Mr. Carter succeeds Wilson H. Moriarty, vice-president of the National Malleable & Steel Castings Co. James H. Smith, general manager of the Central Foundry Division, General Motors Corporation, was elected vice-president.

## G. M. Diesel Engine for Texas Lubricants Research

A full-size, 600-hp. Diesel engine of the type powering General Motors locomotives has been installed in the Beacon Research Laboratories of the Texas Company at Beacon, N. Y., for the purpose of studying locomotive lubricants.

The purpose of the tests is to "tailor" lubricants to the specific requirements of railroad Diesel engines and to enable the petroleum engineer to make controlled studies of field problems. The laboratory will use the engine particularly to study the effectiveness of additives in lubricants on engine cleanliness and on the performance of piston rings, bearings, wrist pins, and other parts.

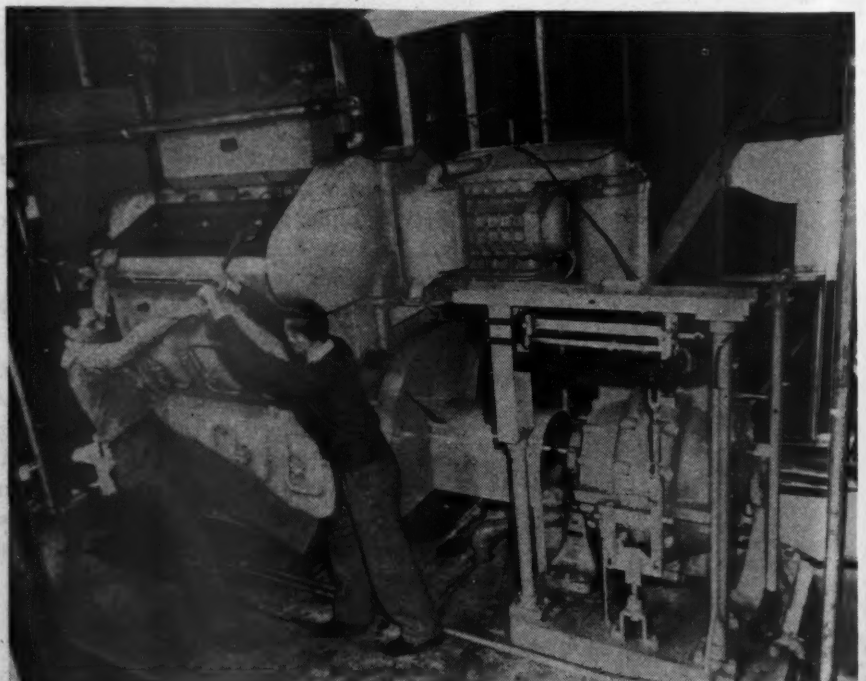
The six-cylinder engine is mounted on a cast-iron bed plate and anchored to bed rock. The engine will be tested under conditions simulating railroad operations, such as stopping and starting and running under varying loads and grades.

## 1948-49 Officers Smoke Prevention Association

At the forty-first annual meeting of the Smoke Prevention Association of America, Inc., held at New York during June, the following officers were elected for 1948-49: President, William G. Christy, smoke abatement engineer, Hudson County, Jersey City, N. J.; first vice-president, W. E. E. Koepler, Pocahontas Operators Association, Bluefield, W. Va.; second vice-president, A. A. Raymond, superintendent fuel and locomotive performance, New York Central System, Buffalo, N. Y.; secretary-treasurer, Frank A. Chambers, chief smoke inspector, Chicago; sergeant-at-arms, Thomas P. Scully vice-president and superintendent, Chicago, West Pullman & Southern, South Chicago, Ill.; public relations director, D. A. Sullivan, engineer, Commonwealth Edison Company, Chicago.

## Alloy Steels' Fiftieth Anniversary To Be Celebrated in October

William T. Faricy, president of the Association of American Railroads, together with seven presidents of other national associations in the alloy-steel consuming and producing fields, and the presidents of the three largest steel producing companies, have accepted appointments from the American Society for Metals to serve with the society's president, Francis B. Foley, and the society's vice-president, Harold K. Work, on the honorary committee covering the "Salute to Alloy Steel," central theme of the National Metal Congress and Exposition, which holds its



**This 600-hp. General Motors railroad Diesel engine has been placed in research laboratories of the Texas Company for testing the performance of railroad-type lubricants**

*For additional information, use postcard, pages 49, 50*

30th annual convention in Philadelphia, Pa., October 25 to 29. The "diamond jubilee" in the development of alloy steels will be celebrated on this occasion.

### Would Honor Roy V. Wright in Essay Contest Title

THE New York Railroad Club's railroad essay prize committee has recommended to the executive committee that the club's railroad essay contest be designated the Roy V. Wright Prize Competition, in memory of the late editor of the *Railway Mechanical Engineer*, who was active in developing plans for the contest. As announced in the July *Railway Mechanical Engineer*, page 103, this competition, which offers substantial prizes for the best papers relating to the improvement and efficiency of railroad administration and operation, will close February 1.

### Equipment Depreciation Rates for Reorganized New Haven

EQUIPMENT depreciation rates for the reorganized New York, New Haven & Hartford are among those prescribed by the Interstate Commerce Commission in a recent series of sub-orders in the general proceeding, Depreciation Rates for Equipment of Steam Railroad Companies. The rates are: Steam locomotives, 2.74 per cent; other locomotives, 3.03 per cent; freight-train cars, 2.68 per cent; passenger-train cars, 2.93 per cent; floating equipment, 2.14 per cent; work equipment, 3.75 per cent; miscellaneous equipment, 15.08 per cent.

### Miscellaneous Publications

ALUMINUM SHEET AND PLATE.—Reynolds Metals Company Aluminum Division, Desk 105, 2500 South Third street, Louisville 1, Ky. 48-page, 6-in. by 9-in. booklet prepared by Reynolds Technical Editorial Service, gives technical information relative to various sheet and plate alloys, gauges, and sizes, both for the experienced and inexperienced user of aluminum. Begins with a brief discussion of cost factors and a comparative analysis of costs of aluminum sheet and plate as against other widely used metals. Summarizes such topics as formability, weldability, riveting and joining, brazing, soldering, machinability, and resistance to chemical attack, with a short discussion of the alloys most suitable. Explains heat-treatable and non-heat-treatable alloys and discusses briefly finishes for aluminum sheet and plate, characteristics of the metal, and the problem of avoiding distortion. Contains tables for computing the weight of various sizes and thicknesses of sheet and plate items, with figures for calculating the weights of a variety of sizes and thicknesses of aluminum circles, also a formula for comparing weights of aluminum with weights of other metals.

## Supply Trade Notes

BUTLER MANUFACTURING COMPANY.—*Donald A. MacNeil* has joined the Butler Manufacturing Company, Kansas City, Mo., as special representative for railroads, with headquarters at 624 South Michigan avenue, Chicago. Mr. MacNeil was formerly associated with the Kelly Steel Works, Inc., Chicago, as vice-president, and before joining the Butler Manufacturing Company was district manager for Tube Turns, Inc., at Chicago.

Donald A. MacNeil

◆

REYNOLDS METALS COMPANY.—*F. L. Sargeant* has been appointed manager of the New York sales division of the Reynolds Metals Company to succeed *Stuart Smith*, who has been appointed special representative to the United States Air Forces with headquarters in Reynolds' Dayton, Ohio, office. Mr. Sargeant was formerly manager of the Kansas City, Mo., and St. Louis sales divisions, successively. *Wilfred P. Lawless* has been appointed manager of the Nashville, Tenn., sales district. Mr. Lawless was formerly in charge of the Charlotte, N. C., sales district.

◆

WESTINGHOUSE CORPORATION; BALDWIN LOCOMOTIVE WORKS—The Westinghouse Corporation has acquired a substantial, but minority, common stock interest in the Baldwin Locomotive Works. *Marvin W. Smith*, a vice-president and chief engineering officer of the Westinghouse Corporation, has been elected executive vice-president and a director of Baldwin. According to a statement made by Charles E. Brinley, chairman of the board of Baldwin, the arrangements whereby Westinghouse has acquired an interest in Baldwin were initiated at the suggestion of *Ralph Kelly*, president of Baldwin, and that the completion of these arrangements has made it possible for Mr. Kelly to exercise his desire to be relieved of executive responsibilities in order to give more time to personal and civic activities. Accordingly, Mr. Kelly has been granted a leave of absence for the remainder of his term of office as president. He will, however, continue as a member of the Baldwin board of directors.

◆

FAIRBANKS, MORSE & CO.—*Robert Aldag, Jr.*, has been appointed manager of the sales engineering department, railroad division, of Fairbanks, Morse & Co., at Chicago.

*Robert Aldag, Jr.*, is a graduate of Purdue University, where he specialized in railway mechanical engineering. He began his railroad career with the Erie and later joined the Chicago, Burlington & Quincy, having supervised the operation of and maintenance of Diesel locomotives. Mr. Aldag joined Fairbanks, Morse in 1946 as sales engineer.

◆

REPUBLIC STEEL CORPORATION.—Production at the Republic Steel Corporation's new Enduro plant No. 2 at Massilon, Ohio, is now under way. The formal opening of the new facilities was marked by a tour of the plant by a group of business paper and newspaper representatives on August 11. The new facilities constitute a substantial increase in Republic's capacity for the production of stainless-steel sheets. They supplement facilities known as Enduro plant No. 1 where flat rolled stainless-steel in widths up to 30 in. is produced. The new plant

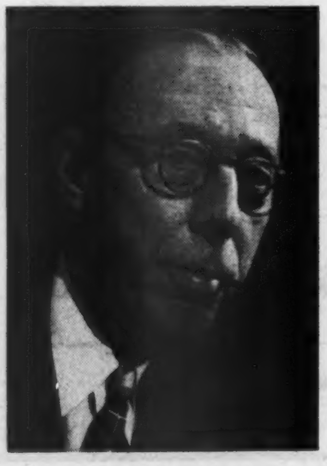
The 66-in. cold-reducing mill is the central piece of equipment in the Republic Steel Corporation's new stainless-steel cold-reducing plant in Massillon, Ohio

 *For additional information, use postcard, pages 49, 50* 

provides cold-reducing, annealing, pickling, and finishing facilities for sheets 60 in. and 48 in. wide on 66-in. and 54-in. cold-rolling reducing mills, respectively. Both mills make reductions from maximum gauge of .3 in. down to a minimum of .015 in. Most of the material is shipped in rolls, interwound with paper to protect the finish.

◆

TEXAS COMPANY—*J. A. Brownell* has been appointed assistant manager of the railway traffic and sales department of the Texas Company, with headquarters at New York. Mr. Brownell joined the Texas Company in October, 1907, as a clerk in the southern sales territory at



**J. A. Brownell**

Dallas, Tex. In 1923 he was appointed assistant to the manager of the railway traffic and sales department.

◆

FAIRBANKS, MORSE & CO.—*Robert Aldag, Jr.*, sales engineer for Fairbanks, Morse & Co., at Chicago, has been promoted to manager of the sales engineering department, Railroad division, at Chicago.

◆

BALTIMORE FOUNDRY & MACHINE CORP.—McCONWAY & TORLEY CORP.—The Baltimore Foundry & Machine Corp. has transferred its sales headquarters from Baltimore, Md., to the firm's parent organization, the McConway & Torley Corp., at Pittsburgh, Pa.

◆

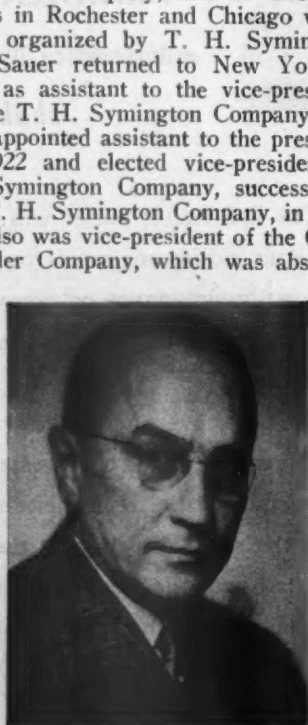
SYMINGTON-GOULD CORPORATION.—*Peter F. Rossman*, special assistant to the president of the Symington-Gould Corporation, has been elected president, with headquarters at Depew, N. Y., succeeding *J. A. Sauer* who has retired as announced in the August issue.

*Peter F. Rossman* began his business career in 1922 with the Maxwell Motor Car Company. From 1923 to 1936 he was associated with the Packard Motor Car Company. In 1936 he joined the airplane division of the Curtiss-Wright Corporation, at Buffalo, N. Y. In 1943 he was invited by Guy W. Vaughan, president of the corporation, to organize and acquire plant and machine facilities for a new development division at Bloomfield, N. J., of which division he became general manager responsible directly to the president. This division was liquidated in December, 1945, at which time Mr. Rossman was appointed

**Peter F. Rossman**

special assistant to the president, with headquarters at New York.

*J. A. Sauer* began his career in the Mt. Clare (Baltimore, Md.) shops of the Baltimore & Ohio, where he worked from June, 1905, to September, 1907, when he joined the T. H. Symington Company at Baltimore. In 1912 he was transferred to New York where he studied evenings at the New York University School of Commerce and was graduated with the class of 1917. In July of that year he went to Rochester, N. Y., as secretary of the Symington-Anderson Company, one of five war plants in Rochester and Chicago which were organized by T. H. Symington. Mr. Sauer returned to New York in 1919 as assistant to the vice-president of the T. H. Symington Company. He was appointed assistant to the president in 1922 and elected vice-president of the Symington Company, successor to the T. H. Symington Company, in 1924. He also was vice-president of the Gould Coupler Company, which was absorbed



**J. A. Sauer**

by Symington in 1925. When the two companies were merged in 1936, Mr. Sauer was appointed executive vice-president and in May, 1944, was elected president. Mr. Sauer was awarded the Frederick A. Lorenz Memorial for 1946 for the most outstanding contribution to the general welfare of the steel castings industry during the preceding year.

◆

AIR REDUCTION SALES CORPORATION.—*John J. Lincoln, Jr.*, has been appointed manager of the railroad department of the Air Reduction Sales Corporation, with headquarters in New York. The railroad department maintains regional sales offices at New York under *C. B. Armstrong*, and at Chicago under *D. J. Williams*, with divisional offices at Cleveland, Ohio, and St. Louis, Mo. Mr. Lincoln joined Air Reduction

**J. J. Lincoln**

in 1924 and after sales work in several districts was appointed manager in Pittsburgh, Pa., in 1934. He moved to New York as regional sales manager in 1938 and has been director of sales services since 1945.

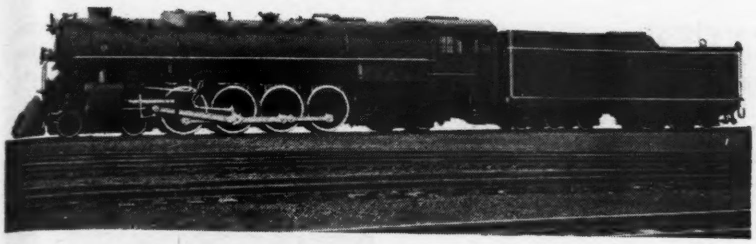
◆

CUTLER-HAMMER, INC.—Cutler-Hammer, Inc., Milwaukee, Wis., has acquired the business of the West Electric Products Company, 1795 Pasadena avenue, Los Angeles, Calif. *W. G. Tapping* Cutler-Hammer district sales manager, will be in charge of the new plant. Sale of the firm's products in the Los Angeles area will continue to be handled at 1331 Santa Fe avenue, Los Angeles 21. The present operating personnel of the West Electric Products Company will be retained as Cutler-Hammer employees. The new plant will be integrated with other Cutler-Hammer plants in the manufacture of motor control, panelboards, lifting magnets, magnetic brakes, electric heating devices and allied electric apparatus.

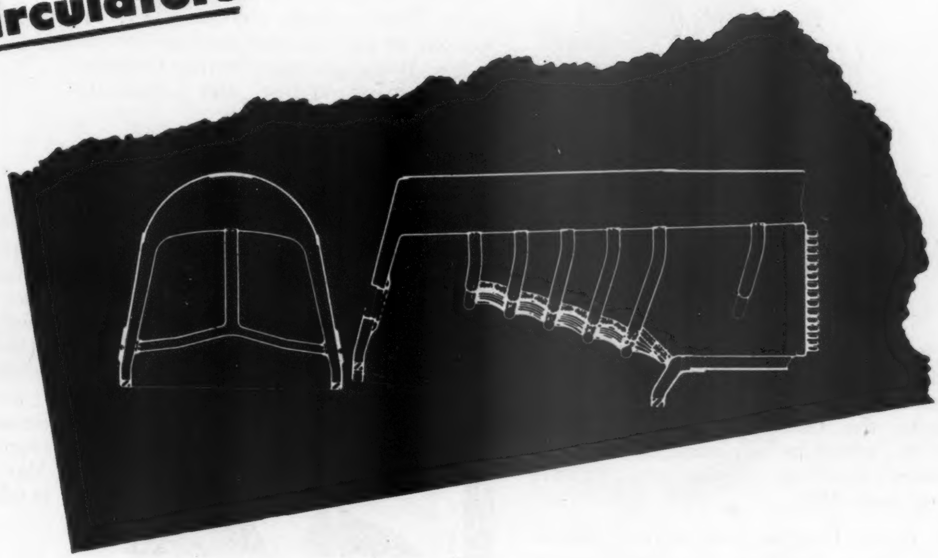
◆

WORTHINGTON PUMP & MACHINERY CORP.—*Harold T. Anderson* has been appointed assistant to the general sales manager, in charge of sales production relations, with headquarters at the Harrison, N.J., works of the Worthington Pump & Machinery Corp. *J. A. Malsi*, railroad service engineer at Richmond, Va., has been transferred to the Standard Products Sales Division of Worthington, with headquarters in Detroit, Mich.

*Harold T. Anderson* joined Worthington in 1924. In 1940 he entered the sales



# Heavy freight locomotives are being equipped with Security Circulators



Typical of the trend toward the use of Security Circulators in modernizing existing steam locomotives, many 4-8-4 freight locomotives are being Circulator-equipped.

In making such installations in existing motive power, the Security Circulators, as shown by the sketch, are suitably proportioned to the size and type of boiler to give the best results in bettering boiler performance and increasing locomotive utilization.

**AMERICAN ARCH COMPANY, INC.**

**NEW YORK • CHICAGO**

**SECURITY CIRCULATOR DIVISION**

department and was engaged in subcontracting activities until 1944, when he was transferred to the steam power division of the general sales department.

◆

DANA CORPORATION.—*Loren J. O'Brien* has been appointed chief engineer of the railway division of Spicer Manufacturing, a division of the Dana Corporation. Mr. O'Brien will be in charge of all railway engineering, including the Spicer positive generator drive and all types of bevel gear applications. He was formerly associated with the Gleason Works, Rochester, N.Y., where he was engaged in various phases and types of bevel-gear engineering since 1935.

**L. J. O'Brien**

◆

H. K. PORTER COMPANY.—*Lawrence A. Franks* has been appointed manager of the Boston district office of the H. K. Porter Company, with headquarters at 294 Washington street, Boston 8, Mass. Mr. Franks was formerly sales engineer for Bird & Sons, Inc.

◆

IRON & STEEL PRODUCTS, INC.—*John F. Parker*, vice-president and treasurer of Iron & Steel Products, Inc., at Chicago, has been elected president and treasurer, succeeding the late *A. G. Bladholm. W. J. Parker*, vice-president and secretary, has been elected executive vice-president and secretary and *Charles A. Marshall*, general manager, has been appointed also vice-president. *J. J. Collins* has been appointed assistant general manager of the company. Mr. Collins was formerly a supervisor of the scrap and reclamation department of the Erie at Meadville, Pa. He had served 37 years with that railroad.

◆

RAPIDS-STANDARD COMPANY.—*George R. Brockway* has been appointed sales manager of the Rapids-Standard Company. Mr. Brockway was formerly assistant sales manager and central regional sales manager. *Lloyd C. Backart,* formerly president and sales manager since incorporation of the firm, will continue to serve as chairman of the board. *Richard R. Williams* has been appointed direct sales representative for the Toledo, Ohio, territory.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY.—Four changes in its transportation division have been announced by the Minneapolis-Honeywell Regulator Company. *C. M. Sanders* has been appointed western area manager, with headquarters in Chicago. Mr. Sanders succeeds *Dale Wissmiller,* who has been transferred to the commercial division staff at the home office. *A. G. Buckley* has been placed in charge of the transportation division's new Cleveland office, moving from the Chicago staff of the division. *Dick Luchtman* succeeds Mr. Buckley as sales engineer in Chicago, and *Gerald A. Loew* has been named division engineer, with headquarters in Minneapolis, Minn.

*C. M. Sanders* is a native of Arkadelphia, Ark., and an engineering graduate of Rice Institute, Houston, Tex. He worked in the air-conditioning division of the Westinghouse Electric Corporation after graduation, and joined the Army in 1942, where he served as captain and radar officer. Following victory, Sanders joined Honeywell in 1946 and served in the specialties division until transferred to the transportation division in 1947.

**C. M. Sanders**

*A. G. Buckley*, a native of Coldwater, Mich., is an engineering graduate of Kansas University. He was employed by a number of heating and air-conditioning firms before joining Honeywell in 1946 when he was assigned to the St. Louis branch office. In 1941, he was transferred to the Memphis branch and in 1943 to the Chicago staff, joining the transportation division as a sales engineer two years later.

**A. G. Buckley**

*Dick Luchtman* is an engineering graduate of Purdue University and a native of Michigan City, Ind. He is also a graduate of the Boeing School of meteorology and served with the Navy as officer-pilot and later as an airline pilot captain for United Airlines. He joined Honeywell early this year and, after completing a training course, was assigned to Chicago.

**D. Luchtman**

*Gerald A. Lowe* is a native of Milwaukee, Wis., and an electrical and mechanical engineering graduate of Marquette University. He had been employed in the industrial control division of the Square D Company, and was assistant engineer in the development section of Allis-Chalmers Manufacturing Company before joining Honeywell's transportation division early in 1947. He has served as engineer for the division until his appointment as chief division engineer.

**G. A. Lowe**

◆

PRESSED STEEL CAR COMPANY.—*Frank L. Johnson,* vice-president of the Pressed Steel Car Company, has been appointed vice-president in charge of railroad sales. Mr. Johnson's headquarters will be in Chicago. Pressed Steel Car also has announced the organization

*For additional information, use postcard, pages 49, 50*

of a research and development division under the direction of *H. E. Chilcoat*, vice-president with headquarters at Pittsburgh, Pa.

◆

Morton - Gregory Corporation. — *Leonard C. Barr, Maurice A. Enright* and *William J. Kane* have been elected vice-presidents of the *Morton-Gregory Corporation.*

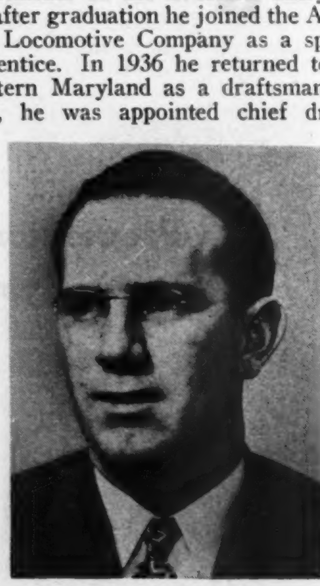
◆

General Electric Company.—*M. R. Hanna,* engineer of the Motor Engineering division at the General Electric Company's Erie Works since 1926, has retired after 45 years' service with the company.

◆

Great Lakes Steel Corporation.—*William J. Crabbs,* formerly assistant chief of motive power and equipment of the Atlantic Coast Line, has joined the Great Lakes Steel Corporation as mechanical engineer in charge of application engineering of the company's nailable steel flooring. *William H. Adams* will continue to supervise research and development for the steel-floor division.

*William J. Crabbs* is a graduate of the Virginia Polytechnic Institute (1934) with a degree in mechanical engineering. During his summer vacations, from 1927 through 1933, he worked in the stores and mechanical departments of the Western Maryland and after graduation he joined the American Locomotive Company as a special apprentice. In 1936 he returned to the Western Maryland as a draftsman. In 1938, he was appointed chief drafts-



W. J. Crabbs

man and in 1940 mechanical engineer. During the recent war, Mr. Crabbs was a major in the Transportation Corps. Following his discharge in 1945 he became mechanical engineer of the Atlantic Coast Line, and in 1947 assistant chief of motive power.

◆

American Hoist & Derrick Co.—The American Hoist & Derrick Co. has announced the appointment of the *Overland Supply Company*, 55 New Montgomery St., San Francisco, Calif., as its exclusive railroad supply agent for the Southern Pacific, the Western Pacific,



*For additional information, use postcard, pages 49, 50*

the Northwestern Pacific, the Oakland Terminal, the Sacramento Northern, the San Diego & Arizona Eastern, the Tidewater Southern and the Pacific Fruit Express Company.

◆

National Carbide Corporation.—*J. Carl Bode,* formerly operating manager, has been elected president of the National Carbide Corporation, succeeding *L. A. Hull* who has become chairman of the board of directors.

◆

Whiting Corporation.—The Atlas Film Corporation has prepared for the Whiting Corporation, Harvey, Ill., a one reel sound motion picture, "Grooming the Streamliners," which explains and shows the operation of Whiting washers in the cleaning of passenger-train equipment on various railroads.

◆

Union Asbestos & Rubber Co.—*Norman C. Naylor,* whose retirement as vice-president of the American Locomotive Company and subsequent election as vice-president of the Union Asbestos & Rubber Co., at Chicago, was reported in the August issue, page 118, was born on June 3, 1881, at Rochester, N.Y. He began his career as an office boy with McKee-Fuller & Co., which was absorbed by the Steel Tired Wheel Company in 1897. The latter firm was likewise absorbed in 1902 by the Railway Steel Spring Company, for which Mr. Naylor later became sales agent. With the purchase in 1926 of the Railway Steel Spring Company by Alco, he became district sales manager in charge of the Chicago office for both companies. In 1930 he was appointed vice-president in charge of western sales offices, at Chicago. Mr. Naylor continues as a director of Alco, to which position he was elected in 1938.

**N. C. Naylor**

◆

Thor M. Olson, vice-president in charge of sales of the Ex-Cell-O Corporation, Detroit, Mich., has resigned.

◆

Flexible Steel Lacing Company.—*William W. Hickey* has been appointed representative of the Flexible Steel Lacing Company in the New England and

New York territory, succeeding John Ramsey who has been transferred to the executive sales office in Chicago. Mr. Hickey, a graduate of Rensselear Polytechnic Institute, had been a sales engineer with the Nash Engineering Company for more than ten years.

W. W. Hickey

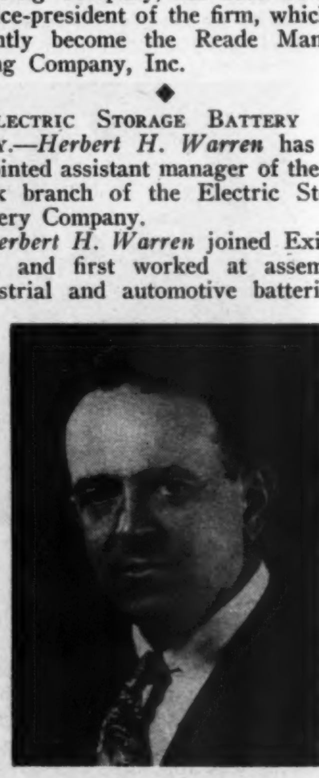
◆

READE MANUFACTURING COMPANY, INC.—*Charles F. Reade*, formerly general sales manager of the Reade Manufacturing Company, has been advanced to vice-president of the firm, which has recently become the Reade Manufacturing Company, Inc.

◆

ELECTRIC STORAGE BATTERY COMPANY.—*Herbert H. Warren* has been appointed assistant manager of the New York branch of the Electric Storage Battery Company.

*Herbert H. Warren* joined Exide in 1921 and first worked at assembling industrial and automotive batteries in the company's New York depot. Three years later he was transferred to the New York branch and was assigned to engineering and sales work. During World War II, he served in the 762nd Railway Shop Battalion in the Persian Gulf Command from 1943 to 1945. In the latter year he was transferred to the European theater of operations and served as batallion executive officer with the rank of major. In January, 1946, Mr. Warren was released from active



H. H. Warren

duty and returned to Exide, where he was assigned to engineering, railway, and industrial sales.

◆

W. B. Connor Engineering Corporation.—*John H. Bartol,* formerly passenger sales supervisor of American Air Lines, has joined the W. B. Connor Engineering Corporation as director of the air recovery division.

◆

International Nickel Company.—*Paul Queneau* has been appointed metallugical engineer of the International Nickel Company of Canada, and subsidiaries. *W. K. Sproule* succeeds Mr. Queneau as superintendent of research.

◆

United States Steel Supply Company.—The United States Steel Supply Company, subsidiary of *U. S. Steel Corporation,* has opened a steel warehouse and facilities in San Francisco, Calif.

◆

Electro-Motive Division, General Motors Corporation.—*Corliss A. Bercaw,* district sales manager of the Electro-Motive Division of General Motors Corporation, with headquarters at Chicago, has been appointed Pacific Coast regional manager, with headquarters at San Francisco, Calif., succeeding *Ernest Kuehn,* who has retired. Mr. Kuehn will remain with the firm as a consultant until January 1, 1949. Mr. Bercaw is succeeded by *George W. Rukgaber,* district sales representative in the Chicago region. A picture of Mr. Rukgaber and a sketch of his career appeared in the June *Railway Mechanical Engineer,* page 116, in connection with his appointment as district sales representative.

*Milton Gardner,* regional service manager at St. Louis, Mo., has been appointed district sales manager, with headquarters at St. Louis. *L. M. Williams,* sales representative, St. Louis region, has been appointed manager of the branch warehouse and service repair shop at Emeryville, Calif. *J. E. O'Leary,* assistant regional service manager at St. Louis, regional service manager at that point. Other appointments in the

**M. Gardner**

St. Louis region include *G. C. Smith,* assistant regional service manager; *Guthrie Hill,* district engineer; *E. A. Tucker,* service engineer, and *Rene Pommier,* regional parts representative. *O. W. Anglemier* has been appointed service engineer with headquarters at Louisville, Ky., a new territory established to cover increased operation of General Motors Diesel locomotives in that area.

*Milton Gardner* became associated with Electro-Motive in February, 1938, as a service engineer. He held various positions in the service department and on July 1, 1946, was appointed regional service manager at St. Louis.

*Corliss A. Bercaw* was born at Holgate, Ohio, and is a graduate in mechanical engineering of the California Institute of Technology. After serving a year as a U.S. Navy aviator, he spent a year as a graduate student in railway engineering and sales with Westinghouse Electric Corporation. During 17 years with Westinghouse, he covered engineering and sales assignments in Pittsburgh, Pa., Philadelphia, Chicago and Washington, D.C., three years of which were spent in negotiating foreign railroad electrification projects. Mr. Bercaw was with the Baldwin Locomotive Works for three years as sales manager of Diesel locomotives. In 1943 he became general manager of the Springfield (Ohio) plant of Elliott & Co. and in 1945 joined Electro-Motive as district sales manager in the Chicago region.

The Electro-Motive Division of G.M.C. plans to open a third plant near Cleveland, Ohio, next January, to be devoted exclusively to the manufacture of switching locomotives, according to C. R. Osborn, general manager of Electro-Motive. The plant was acquired recently by General Motors from the Navy, for which the facility was built in 1942. It will afford Electro-Motive 460,000 sq. ft. of additional floor space. The company expects to begin moving machinery into the newly acquired plant in July. The space made available at the firm's plants No. 1 and No. 2, at La Grange, Ill., and Chicago, respectively, as a result of the move will be devoted to increased production of Diesel-electric road locomotives. The plant is located on a 44½-acre site in Brooklyn, Ohio, a Cleveland suburb, and consists of a 765-ft. by 500-ft. main building, a two-story office building and a receiving warehouse area. A portion of the facility will be occupied by G.M.'s Cleveland Diesel Engine Division, which occupied the plant during the war as a builder of Diesel engines for the Navy.

◆

ALLIS-CHALMERS MANUFACTURING COMPANY.—A sixth region for the field organization of the *Allis-Chalmers Manufacturing Company's* general machinery division has been organized under *William Arthur,* formerly Philadelphia, Pa., district office manager, The new area, designated as the mid-Atlantic region, with headquarters in Philadelphia, will embrace territory now covered by the Philadelphia, Wilkes-Barre, Baltimore,

York, Richmond and Charleston offices. The York and Charleston offices, managed by *G. E. Conn* and *R. L. Halsted*, respectively, formerly branch offices, become district offices under the regional plan. *Frank Feyler*, manager of the Cincinnati, Ohio, district office since 1944, succeeds Mr. Arthur as Philadelphia district manager, and *W. F. Daly*, manager of the power section of the company's steam turbine department since 1943, succeeds Mr. Feyler.

◆

LIMA-HAMILTON CORPORATION.—*C. B. Murphy* has been appointed to represent the *Lima-Hamilton Corporation* in the sale of Diesel engines and power engineering equipment in the southwest. Mr. Murphy's headquarters will be at 3130 Daniels street, Dallas, Texas.

◆

MORTON-GREGORY CORPORATION. The Nelson Stud Welding division of the Morton-Gregory Corporation has established a new customer engineering service department at its Lorain, Ohio, headquarters, under the direction of *Robert C. Singleton*.

Mr. Singleton, who joined the stud-welding organization in 1945 as field engineer and has served as chief metallurgist and technical adviser at Lorain,

**R. C. Singleton**

will be in charge of engineers and metallurgists in the new engineering service department at the Lorain plant. He is a graduate in metallurgical engineering of the University of California and a member of the American Welding Society and of the American Society for Metals. Before his association with the Nelson organization, Mr. Singleton was metallurgical engineer in the employ of the Joshua Hendy Iron Works at Sunnydale, Calif.

◆

CUMMINS ENGINE COMPANY.—*Carl R. Fox*, recently elected to the board of directors of the Cummins Engine Company, as reported in the June issue, page 110, was incorrectly described in that issue as a former vice-president and works manager for the firm. Mr. Fox, who has been a vice-president and works manager for Cummins Engine for several years, retains both positions.


*For additional information, use postcard, pages 49, 50*

## Obituary

Albert G. Bladholm, president of Iron & Steel Products, Inc., at Chicago, died at St. Luke's Hospital in that city on July 6, following a short illness. Mr. Bladholm had headed the firm since 1942 and prior to that time he had been associated with Briggs & Turivas, steel warehouse firm, at Blue Island, Ill.

◆

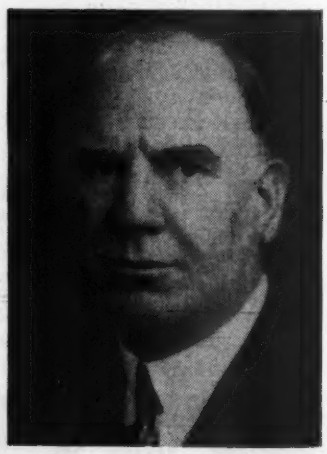
John Allison, chief engineer of the Pittsburgh Steel Foundry Corporation, Glassport, Pa., died on July 8, at his home in Swissvale, Pa.

◆

Harry G. Lewis, President of the Electric Service Manufacturing Company, died on July 15. Mr. Lewis was born in England in 1876 and came to the United States at an early age. He joined Electric Service Manufacturing in 1901, and in 1916 he was appointed sales manager. He was elected vice-president in 1919 and, in 1923, joined the board of directors. He was appointed sales director in 1937 and general manager in 1944. Mr. Lewis has been president of the company since April, 1945.

◆

Frederick A. Stevenson, former president of the American Car & Foundry Co., who retired from active service in May, 1947, died suddenly on July 29, in Wilmington, Del., while on his way to New York from Florida. Mr. Stevenson was 68 years of age. He had been associated with American Car & Foundry for more than forty years in various capacities—as master mechanic, assistant general manager, assistant vice-president in charge of operations, vice-president, senior vice-president and as president. During World War I he was in direct charge of the A.C.F. plants heavily engaged in the production of artillery vehicles, shells, etc. During World War II he was in charge of all the company's engineering and production involved in



F. A. Stevenson

the emergency program of building combat tanks, tractors, landing vehicles, shells and marine equipment. Mr. Stevenson was a member of the Newcomen Society, the American Society of Mechanical Engineers and the New York Railroad Club.



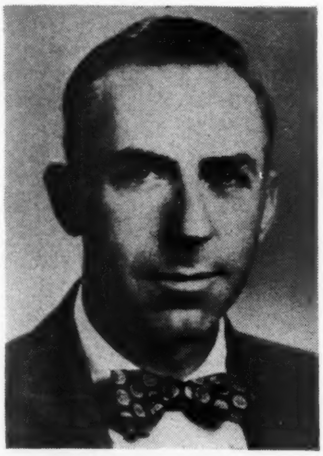
For additional information, use postcard, pages 49, 50

# Personal Mention

## General

E. J. Crawford, formerly superintendent of motive power, Western district, of the Chicago & North Western, who of late has been engaged in other duties due to ill health, has been appointed superintendent of motive power, Northern district.

Russell W. Seniff, engineer of tests of the Alton at Chicago, has been appointed engineer of tests of the Baltimore & Ohio, with headquarters at Baltimore, Md. Mr. Seniff is a graduate of the Illinois Wesleyan University. He began his railroad career in 1924 as a chemical engineer in the employ of the Chicago & Alton, the predecessor of the



**R. W. Seniff**

Alton. He was appointed engineer of tests of the Alton in 1944, but has been loaned to the B. & O. on several occasions for special work. During the war Mr. Seniff served as a consultant for the U. S. Army Engineers. He is the author of four technical treatises and is the holder of two patents for control apparatus on steam boilers.

George W. Bohannon, assistant general mechanical officer at the Chicago & North Western, at Chicago, has been appointed chief mechanical officer, with headquarters at Chicago.

J. C. Stump, superintendent of motive power, Northern district of the Chicago & North Western at Chicago, has been appointed assistant chief mechanical officer.

F. H. Green, road foreman of equipment of the Denver & Rio Grande Western at Salida, Colo., has been appointed to assistant superintendent of air brakes, with headquarters at Denver, Colo.

R. G. Norton, road foreman of engines, Norfolk terminal, of the Norfolk & Western, has been appointed supervisor of smoke abatement, a position created as part of the N. & W. campaign to reduce excessive smoke, in

which the railway is cooperating with other carriers in projects of Bituminous Coal Research, Inc. Mr. Norton will be attached to the staff of the vice-president and general manager and will work directly with supervisors and engine crews all over the line. He will maintain headquarters at Roanoke, Va.

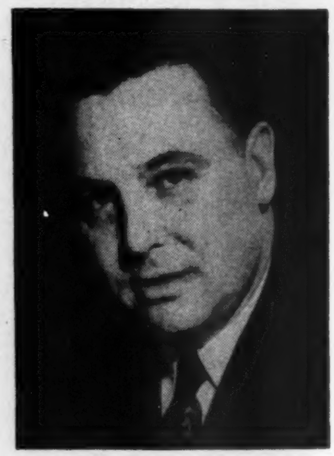
C. H. KNOWLTON, assistant engineer motive power of the New York Central system at New York, has been appointed engineering assistant to the chief engineer motive power and rolling stock, at New York.

J. E. ENNIS, engineering assistant to the chief engineer of motive power and rolling stock of the New York Central System at New York, has retired after 37 years of service with the N. Y. C.

G. M. DAVIES has been appointed assistant engineer motive power of the New York Central System with headquarters at New York.

F. J. KASSUTH, superintendent car shops of the New York Central at East Buffalo, N. Y., has been appointed assistant superintendent of equipment, with headquarters at New York.

J. E. GOODWIN has been elected to fill the newly created position of vice-president and executive assistant to the president of the Chicago & North Western, at Chicago. Mr. Goodwin was born at Topeka, Kan., in 1902, and is a graduate of Lake Forest College and the University of Chicago. He entered railroad service as a machinist apprentice in the employ of the Atchison, Topeka & Santa Fe in 1918, serving there until 1922 while attending school during the winter months. After leaving college, Mr. Goodwin went with the Missouri Pacific as a machinist. In 1927 he became enginehouse foreman; in 1929, erecting foreman; in 1932, schedule supervisor; in 1933, production engineer; in 1935, general foreman, and in 1939, acting shop superintendent. In 1941 he became master mechanic of the International-Great Northern. The following year he returned to the Missouri Pacific as mechanical superintendent. In 1943 he was appointed assistant chief mechanical officer of the C.&N.W.



J. E. Goodwin



For additional information, use postcard, pages 49, 50

and two years later, chief mechanical officer. Mr. Goodwin is vice-chairman of the Mechanical Division, A.A.R.; president of the Western Railway Club; chairman of the Coordinated Mechanical Associations, and a past president of the Locomotive Maintenance Officers Association.

Walter R. Hedeman, engineer of tests, of the Baltimore & Ohio at Baltimore, Md., has retired. Mr. Hedeman was born on June 16, 1878. He received his education in elementary schools, the Maryland Institute, and through the International Correspondence Schools. In 1903 he entered the Mt. Clare, Baltimore, Md., shops of the B. & O. as a machinist. In 1909 he became a draftsman, and in 1922 a chief draftsman. In July, 1927, he was appointed assistant mechanical engineer; in July, 1937, assistant to chief of motive power and equipment, and in April, 1938, engineer of tests. Mr. Hedeman is a member of the Mechanical Division, A.A.R., and has actively participated in the work of the committees on Specifications for Materials, Wheels, and Reciprocating Locomotives. He is a member of the Master Boiler Makers' Association, the New York Railroad Club, and the American Society for Testing Materials (railroad representative).

## Diesel

August J. Brockman has been appointed general Diesel supervisor of the Southern at Spencer, N. C.

## Car Department

J. C. Parker, assistant superintendent of the car department of the Atlantic Coast Line, has been appointed superintendent of the car department with headquarters at Wilmington, N. C.

J. C. Parker, whose appointment as superintendent car department of the Atlantic Coast Line, with headquarters at Wilmington, N. C., was announced

J. C. Parker

in the August issue, was born at Headland, Ala., on July 4, 1914. He entered the service of the Atlantic Coast Line on March 25, 1935, as an apprentice. He completed his apprenticeship in July, 1939, and then became successively coach mechanic at Waycross, Ga.; gang foreman; assistant foreman car department at Waycross, and, in June 1943, assistant foreman car department at Rocky Mount, N. C. Mr. Parker was appointed assistant superintendent car department at Wilmington on March 24, 1947.

G. H. Comer, division general car foreman of the New York Central system at Chicago, has been appointed superintendent of shop (East Buffalo car shop) with headquarters at East Buffalo, N. Y.

G. H. Comer has been appointed superintendent of the East Buffalo, N. Y., car shop of the New York Central.

Leon F. Harrison has been appointed assistant superintendent of the car department of the Atlantic Coast Line with headquarters at Wilmington, N. C.

## Electrical

J. C. McElree, whose retirement as electrical engineer of the Missouri Pacific at St. Louis, Mo., was reported in the July issue, was born in Republic County, Kan., on May 5, 1878. Mr. McElree began his railway career on the Illinois Central on September 1, 1904, serving successively as electrician, electrical foreman, and assistant chief electrician until 1919, when he transferred to the Central of Georgia as electrical engineer. He became electrical engineer of the Missouri Pacific at St. Louis in 1923.

## Master Mechanics and Road Foremen

J. H. Webb, apprentice instructor of the Texas & Pacific, has been appointed assistant master mechanic at Marshall, Tex.

A. R. Sykes, master mechanic of the Southern Kansas and Central Divisions of the Missouri Pacific at Coffeyville Kan., has retired.

J. C. Dietrich, acting master mechanic of the Missouri Pacific, has been appointed master mechanic of the Southern Kansas and Central divisions, with headquarters at Coffeyville, Kan.

J. McMurtry, division master mechanic of the Canadian National at London, Ont., has retired on pension after many years of service.

W. E. Hughes, road foreman of engines of the Canadian National, has been appointed division master mechanic at London, Ont.

D. L. Ringler, master mechanic of the Texas & Pacific, with headquarters at Marshall, Tex., has been transferred to Big Springs, Tex.

R. A. Parrish, general foreman of the Georgia, has been appointed master mechanic, with headquarters as before at Augusta, Ga.



*For additional information, use postcard, pages 49, 50*